EXCLUSIVE: Router table multi-joint jig p. 50

Better Homes and Gardens®

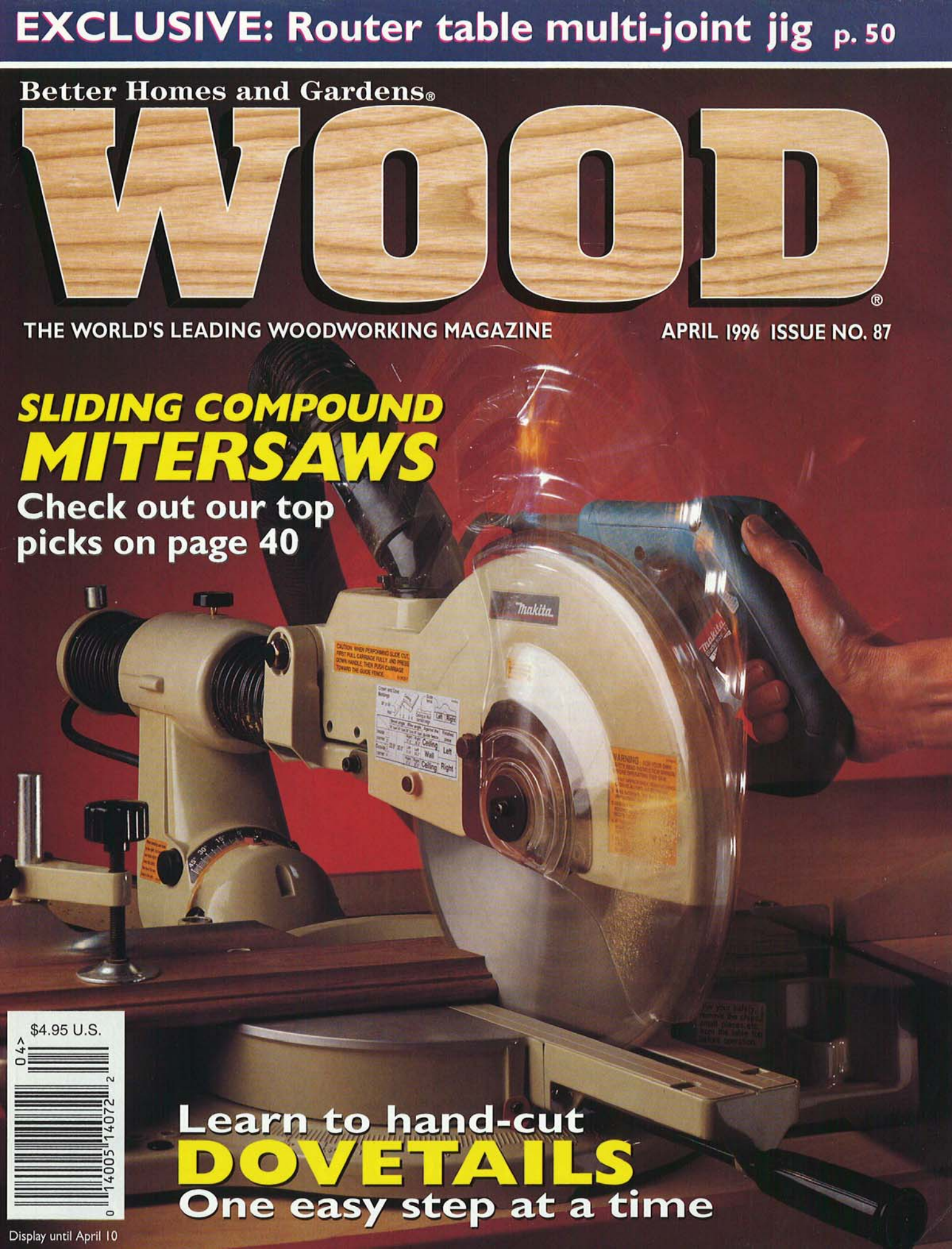
WOOD®

THE WORLD'S LEADING WOODWORKING MAGAZINE

APRIL 1996 ISSUE NO. 87

SLIDING COMPOUND MITERSAWS

Check out our top picks on page 40



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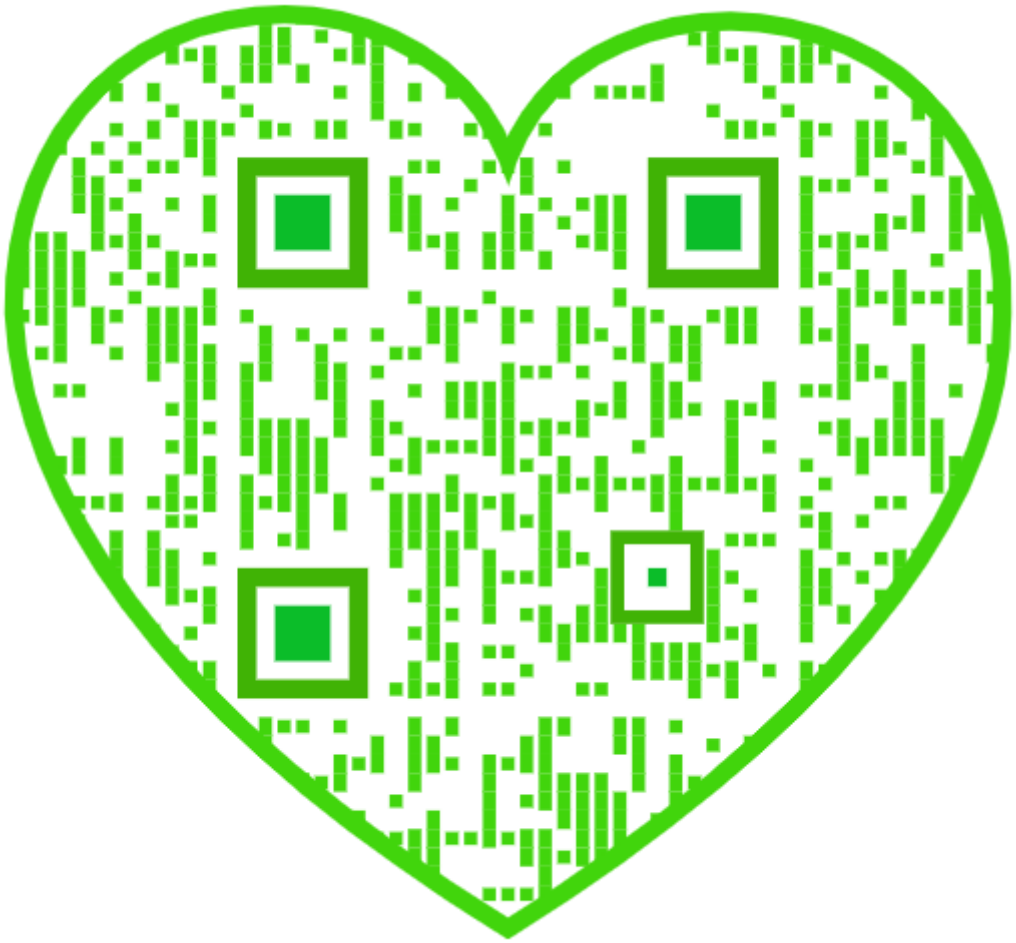

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ABC membership applied for.

THE EDITOR'S ANGLE

IS THIS A GREAT JIG OR WHAT?

That's me checking out the Router-Table Multi-Joint Jig in the *WOOD* magazine shop.

Here's hoping that a whole lot of you acted on my advice last issue to build the Super-Versatile Drill-Press Jig (February 1996, page 38). If you have, you know why I was so excited about it.

But wait, there's more good news from the *WOOD®* magazine jig-development team. They've come up with another *WOOD* magazine exclusive (shown at *right*): the Router-Table Multi-Joint Jig. It will transform your router table into a custom milling machine that turns out stub and mitered tenons, mortises, box and finger joints, blind dovetails, and stopped cuts easily and accurately every time. Incredible!

You'll find complete step-by-step directions for how to build and use this marvelous invention on *pages 50-53*. And as with last-issue's drill-press jig, you can order a ready-to-assemble kit for the router-table jig if you don't have time to build one for yourself. See *page 51* for information on how to order one.

Editors'-Choice insignias debut in this issue

When you read the Sliding Compound Mitersaws article on *page 40,* you'll notice our new Editors'-Choice insignias (pictured *below*) alongside the winning tools. We'll award the "Editors'-Choice" Top-Tool insignia to the product(s) that outperform all others tested for the article. The "Editors'-Choice Top Value" insignia goes to the product(s) that offer the best blend of performance and price.

These colorful insignias will make it possible for you to quickly pinpoint our top-ranked tools. We're also hoping that tool manufacturers and woodworking-supply catalogs will use them for the same reason.

When you see these insignias, you can buy with utmost confidence that the tool will perform well for you in your shop.

Our two new "Editors'-Choice" tool insignias—(left) for best overall tool and (right) best blend of performance and price.

Photograph: Hetherington Photography

Print this article

Larry Clayton

Better Homes and Gardens®
WOOD®
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This issue's cover wood grain: white ash

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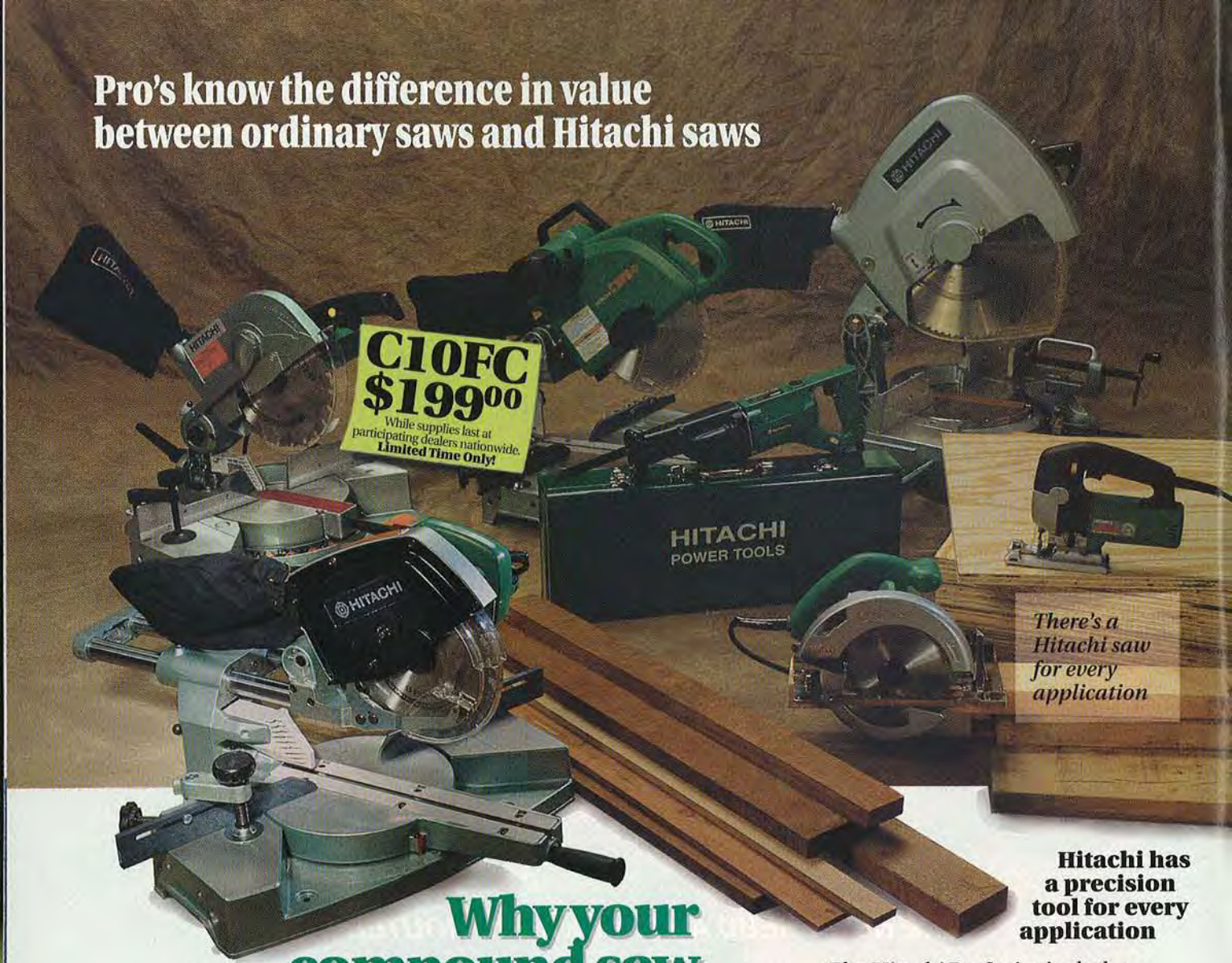

Why your compound saw should be a Hitachi ProSeries compound saw

Precision work begins with precision tools

Your quality materials and careful work deserve the precision and control *which are only possible* with tools engineered and manufactured to the most rigid specifications possible. That's why you should never settle for less than the Hitachi ProSeries.

For example: The **Hitachi C10FC 10" compound miter saw** will add the versatility of *perfect* miter cuts, bevel cuts, and compound cuts to your projects. With the C10FC you can create the precision joints that add beauty and value to everything you make.

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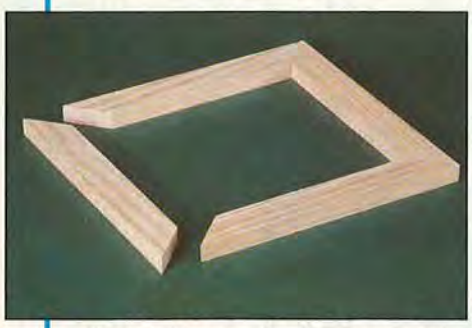
What woodworkers need to know

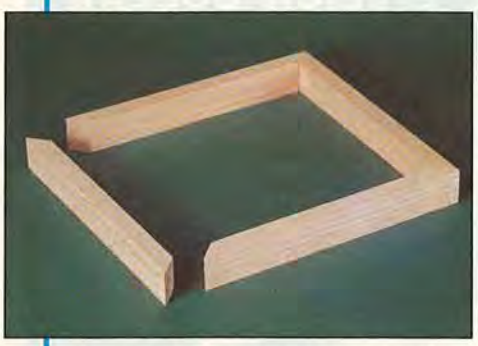
COMPOUND MITERS

You've got to know the angles

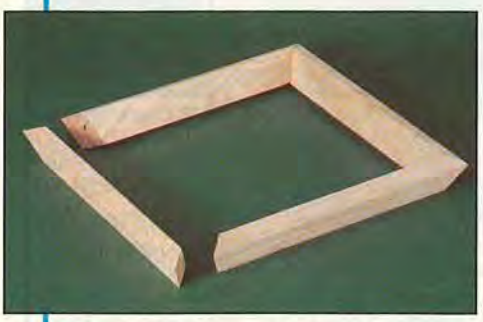
Shadowbox frames look great, and the corners are easy to cut on a tablesaw. The trick in cutting those corners—a combination miter-cut and bevel-cut—comes in knowing how far to tilt the blade and how much to angle the miter gauge. Here's help.



Mitered sides result when you set the miter gauge to a 45° angle and leave the blade vertical.



Beveled sides result when you set the miter gauge to 90° and tilt the blade to a 45° angle.



Slanted sides call for compound-miters, a combination miter-cut and bevel-cut.

Say you have four ¾×2×12" pieces of stock to fashion into a square frame. Using your tablesaw, you could cut the ends of the pieces any of several ways.

One choice would be to adjust your miter gauge to 45° and set the blade tilt to 0° (vertical). The result would be simple miters that join into a flat frame like the one shown *left*.

An option would be to tilt the blade to 45°, set the miter gauge to 90°, and bevel-cut the ends of the pieces. Sawn this way, the pieces would join into a deep frame like the one shown *left*.

Or you could flare out the sides to add some flair to your frame, as in the example *bottom left*. Cutting these corners calls for a combination bevel-cut and miter-cut known as a compound miter. Sawing it, as shown *above right*, isn't difficult. It's determining the correct angles for blade tilt and the miter-gauge setting that proves troublesome.

That's because the simple calculation that gives you a bevel angle or miter angle alone (180° divided by the number of sides) goes right out the shop window for compound miters. The mathematics of compound angles is far from simple.

You can just look it up

But thanks to our handy Compound-miter chart on *page 6*, you won't have to do any figuring at all. You can just look up the values you need.

A compound miter results from sawing a miter with the blade tilted. You can find the bevel and miter settings you need by refering to the compound-miter chart on *page 6*.

First decide the Side Tilt Angle, how much you want the sides of your project to slope. Then, go to the chart column headed Side Tilt Angle, and find the tilt angle you selected. Follow the line across to the column that shows the number of sides your project will have.

Tilt your saw blade to the angle shown in the Blade° side of the column. (If your saw uses 90° for vertical rather than 0°, subtract the value shown from 90°, and tilt the blade to that angle.) Set your miter gauge to the angle shown under Miter°.

Saw and assemble scrapwood test pieces before cutting the project parts.

Continued on page 6

Photographs: King Au; John Hetherington
Illustrations: Roxanne LeMoine
Written by Larry Johnston

What woodworkers need to know

COMPOUND MITERS

Continued from page 5

SIDE-TILT ANGLE	FOUR SIDES				FIVE SIDES		SIX SIDES		EIGHT SIDES	
	BUTT		MITER		MITER		MITER		MITER	
	BLADE°	MITER°	BLADE°	MITER°	BLADE°	MITER°	BLADE°	MITER°	BLADE°	MITER°
5°	1/2	85	44 3/4	85	35 3/4	86 1/2	29 3/4	87 1/2	22 1/4	88
10°	1 1/2	80 1/4	44 1/4	80 1/4	35 1/4	82 3/4	29 1/4	84 1/2	22	86
15°	3 3/4	75 1/2	43 1/4	75 1/2	34 1/2	79 1/4	29	81 3/4	21 1/2	84
20°	6 1/4	71 1/4	41 3/4	71 1/4	33 1/2	76	28 1/4	79	21	82
25°	10	67	40	67	32 1/4	73	27 1/4	76 1/2	20 1/4	80
30°	14 1/2	63 1/2	37 3/4	63 1/2	30 1/2	70	26	74	19 1/2	78 1/4
35°	19 1/2	60 1/4	35 1/2	60 1/4	28 3/4	67 1/2	24 1/2	71 3/4	18 1/4	76 3/4
40°	24 1/2	57 1/4	32 1/2	57 1/4	26 3/4	65	22 3/4	69 3/4	17	75
45°	30	54 3/4	30	54 3/4	24 1/2	62 3/4	21	67 3/4	15 3/4	73 3/4
50°	36	52 1/2	27	52 1/2	22 1/4	61	19	66 1/4	14 1/2	72 1/2
55°	42	50 3/4	24	50 3/4	19 3/4	59 1/4	16 3/4	64 3/4	12 1/2	71 1/4
60°	48	49	21	49	17	57 3/4	14 1/2	63 1/2	11	70 1/4

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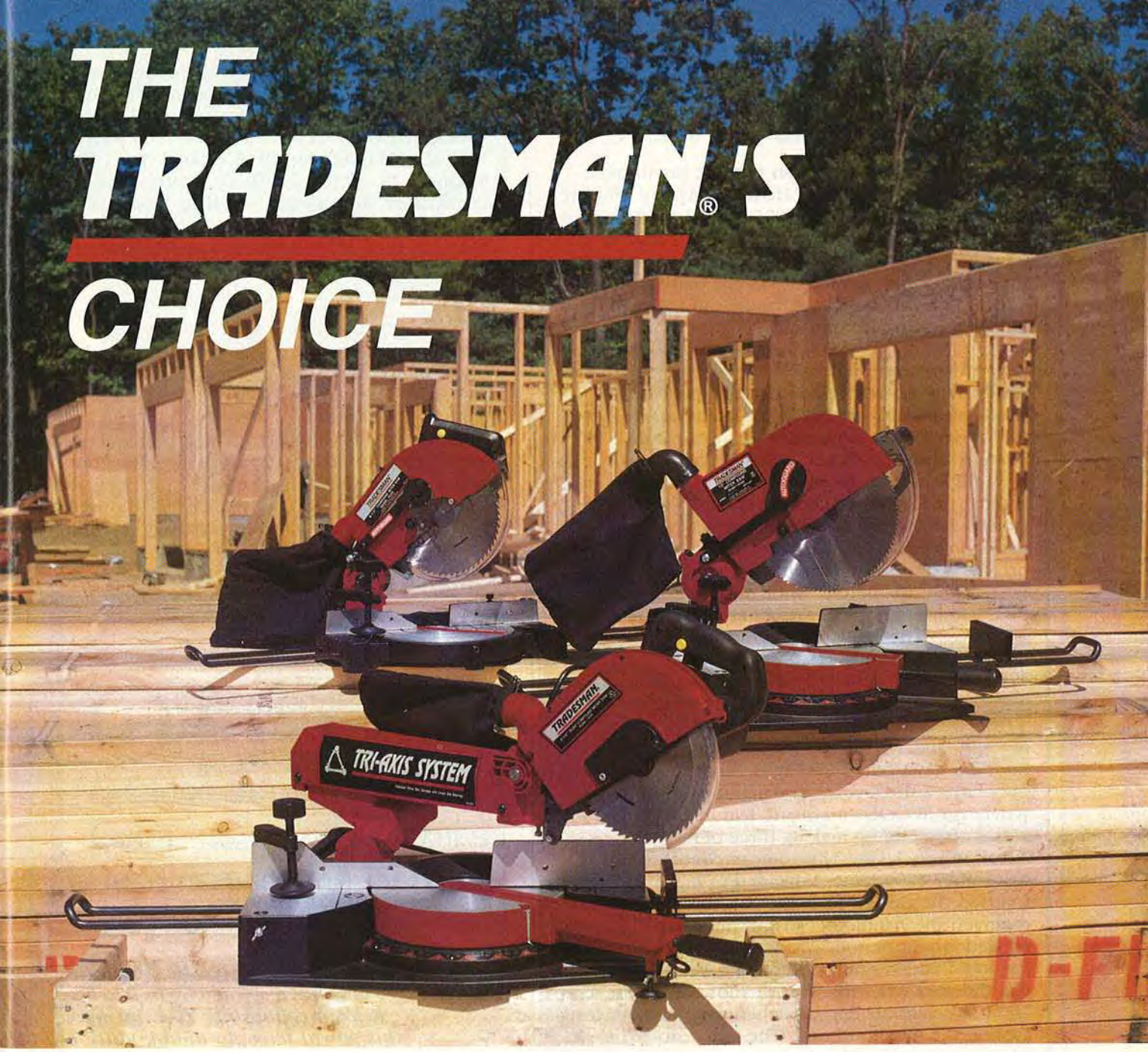

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No more skid marks on plastic laminates

I read with interest "How to Apply Plastic Laminates" in the August 1995 issue. I have a tip for eliminating the router marks when trimming the edge of a shelf or top with a router bit. Just apply a thin coat of petroleum jelly to the laminate on the edge. Then, trim with the router, and wipe off the petroleum jelly after finishing.

—Bob Merrill, Wilbraham, Mass.

Nifty way to remove contact cement

I was pleasantly surprised to see the article "How to Apply Plastic Laminates" in the August 1995 issue. I have never been satisfied with the solvents used for cleaning excess adhesive (such as plastic-laminate adhesive or contact cement) from plastic laminate, and you may be interested in a another method I've discovered. Before starting a laminate project, I pour out enough adhesive to make a ball ½" to ¾" in diameter. Wait until it is nearly dry, then use it as an eraser, rubbing it over the excess adhesive. The ball picks up the excess, quickly resulting in a clean surface.

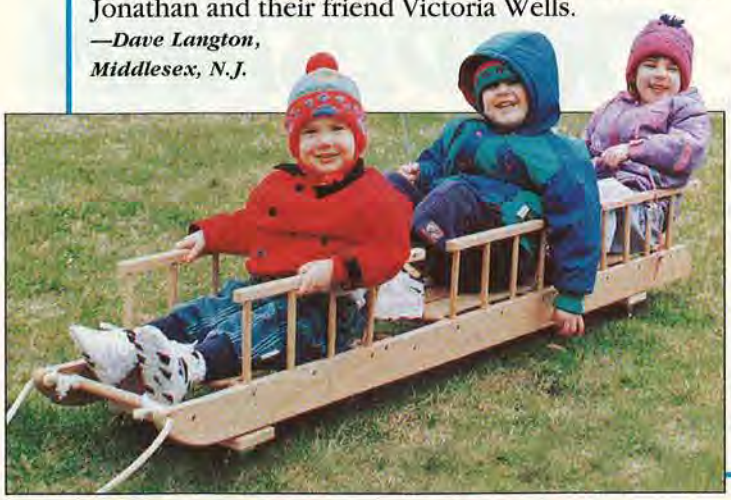
—Frederick A. Jones, Rogers, Ark.

This reader stretched the plan

My wife and I are close friends with another couple. We have two sons, ages three and one, and they have a three-year-old daughter. Consequently, whenever *WOOD*® magazine features a project for kids, I often end up making three of them.

But when I saw the "Snow Stroller" in the November 1994 issue, I decided to make a change. I varied the design to make it a three seater, and removed the handle because I thought the extended sled would be too hard to push. Then, to finish the job, I added removable wheel sets so we could use the sled when there's no snow. Both the kids and the neighbors enjoy it when we make our trips around the neighborhood. The kids featured in the photo are (from the front) my sons Ryan and Jonathan and their friend Victoria Wells.

—Dave Langton, Middlesex, N.J.

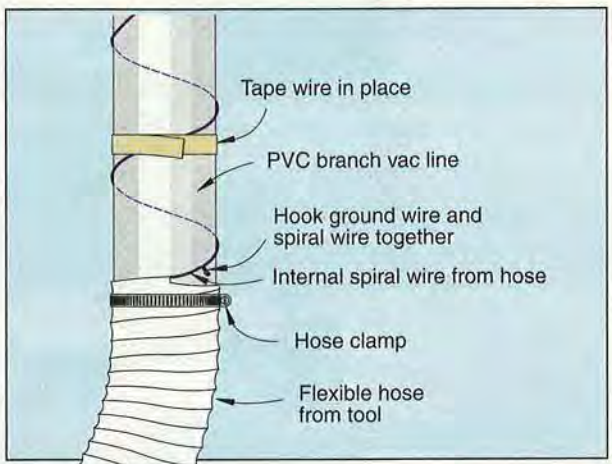


How to ground it

While I was researching information for a dust-collection system for a new shop, I ran across the *WOOD* magazine IDEA SHOP™ article in the September 1992 issue.

I'm aware of the importance of grounding plastic collection pipe against static buildup, but I have another question. Your layout used the same branch drop for the planer and the tablesaw. How was the flexible plastic connecting hose grounded?

—Randolph Mateer, Detroit


Tape wire in place
PVC branch vac line
Hook ground wire and spiral wire together
Internal spiral wire from hose
Hose clamp
Flexible hose from tool

Most flexible plastic connecting hose has a spiral wire in it to keep it from collapsing. You can make this spiral wire do double duty by using it as a ground wire. If you use PVC pipe for the main ducting, you should connect the spiral wire to the ground wire that runs along the PVC pipe. Do this by pulling an inch or two of the spiral wire out of the hose before you clamp the hose to its blast gate. Then, connect the spiral wire to the main-duct ground wire.

The IDEA SHOP dust-collection system you refer to uses grounded metal ducting. So, we connected the spiral wire in the plastic hose to the metal ducting.

Some flexible plastic hose does not have an internal spiral wire. If you use it, you will need to run a single continuous grounded wire along the outside of the hose.

Print this article

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Frustrated With The Quality Of Your Sleep?

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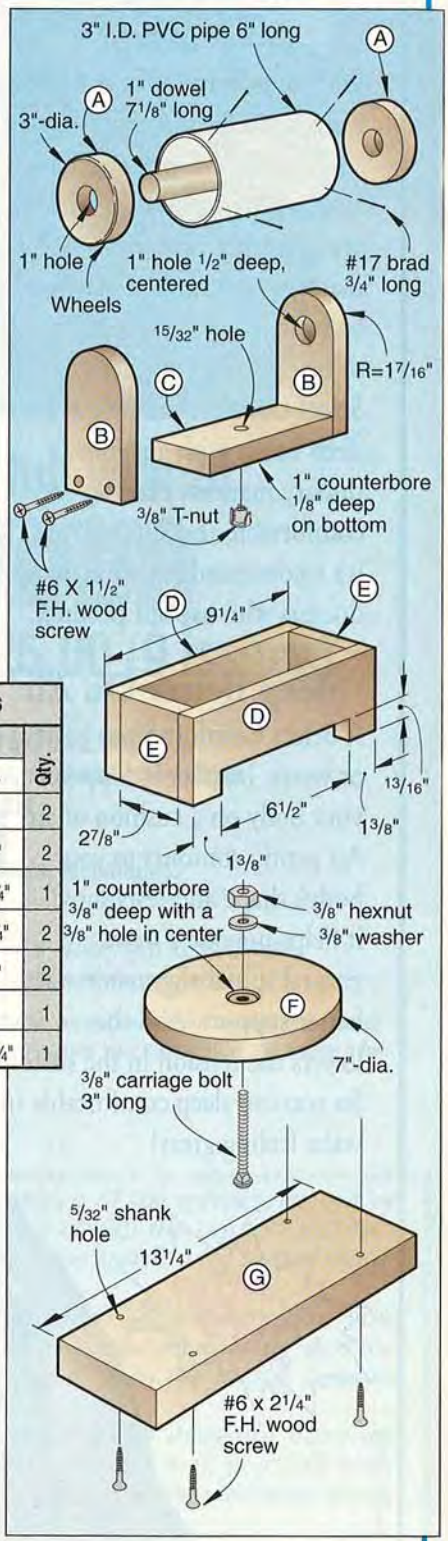
BENCHTOP WORK SUPPORT



If you work with benchtop tools, you know how tricky it can be trying to support long pieces of stock. This project will end all those hassles. It supports your workpieces with precision because you can micro-adjust the height of the PVC roller through a 1" range by turning the height-adjustment disc (F).

To start, cut and epoxy the wheels (A) to the inside of the PVC roller, and insert the 1" dowel in the hole in the wheels. Sand the holes, if necessary, so that the dowel rotates without binding. Glue and screw together the roller carriage (B, C) with the PVC roller in place. Then dry-clamp the base (D, E). The roller carriage (B, C) should fit snugly, but not bind inside the base. If it binds, sand the edges of the roller carriage. If it fits too loosely, make paper-thin cuts off the end grain of parts D or E, whichever needs reducing.

Now, glue and screw the base together. Fasten the carriage bolt to the height-adjustment disc (F) with a lock nut and washer, and then thread the carriage bolt through the T-nut in the roller carriage. Insert the carriage into the base, and screw the base to the sub-base (G). You may need to make the sub-base out of thicker or thinner stock depending on the height of the tools you'll be using.

Bill of Materials

Part	Finished Size T	W	L	Qty.
A	3/4"	3"- dia.		2
B	3/4"	2 7/8"	5"	2
C	3/4"	2 7/8"	6 1/4"	1
D	3/4"	3"	9 1/4"	2
E	3/4"	2 7/8"	3"	2
F	3/4"	7"- dia.		1
G	1 1/2"	4 7/8"	13 1/4"	1

To get the roller dead level with your tool tabletop, position both on your bench the appropriate distance apart for the workpiece. Clamp the support to your benchtop, and lay a straightedge across the tabletop and roller. Turn the height-adjustment disc until you can't see any light underneath the straightedge on the tool tabletop.

Project Design: Gary Elderton
Photograph: John Hetherington
Illustration: Roxanne LeMoine

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TIPS FROM YOUR SHOP (AND OURS)

Are you spending more time cleaning up your shop than woodworking?

Sometimes, it seems like it takes longer to clean up sawdust than it does to cut the boards that the sawdust comes from. That's why I like Norman Ward's tip on using a trash-bag stand under the tablesaw. If you don't own a dust-collection system, Norman's idea will save you time and keep your shop cleaner.

A lot of our shop tips deal with dust collection, but clamping, sanding, and finishing tips also prove popular. And we're always in the market for handy jigs and fixtures. If you've ever solved a woodworking problem with a solution of your own making, your idea may be worth $40 or even a tool prize. To be considered for publication, send a letter with a photo or drawing of your idea to:

Tips From Your Shop (and Ours)
***WOOD*® Magazine**
1912 Grand Ave.
Des Moines, IA 50309-3379

We try to publish original shop tips, so send your idea to only one magazine. Also note that we cannot return your submissions. Thanks, and keep those shop tips coming.

Tom Jackson
General-Interest Editor

Trash bag and PVC frame catch dust under tablesaw

This PVC-pipe frame supports a trash bag that captures the dust falling through the bottom of your tablesaw. And it's easy to install and remove because the frame folds down.

Size the opening for the trash bag slightly larger than the opening in the bottom of your tablesaw cabinet. Make the height of the frame about ⅛" shorter than the distance from the floor to the bottom of your tablesaw cabinet. The pipe insulation will fill the slight gap between the PVC and the saw cabinet.

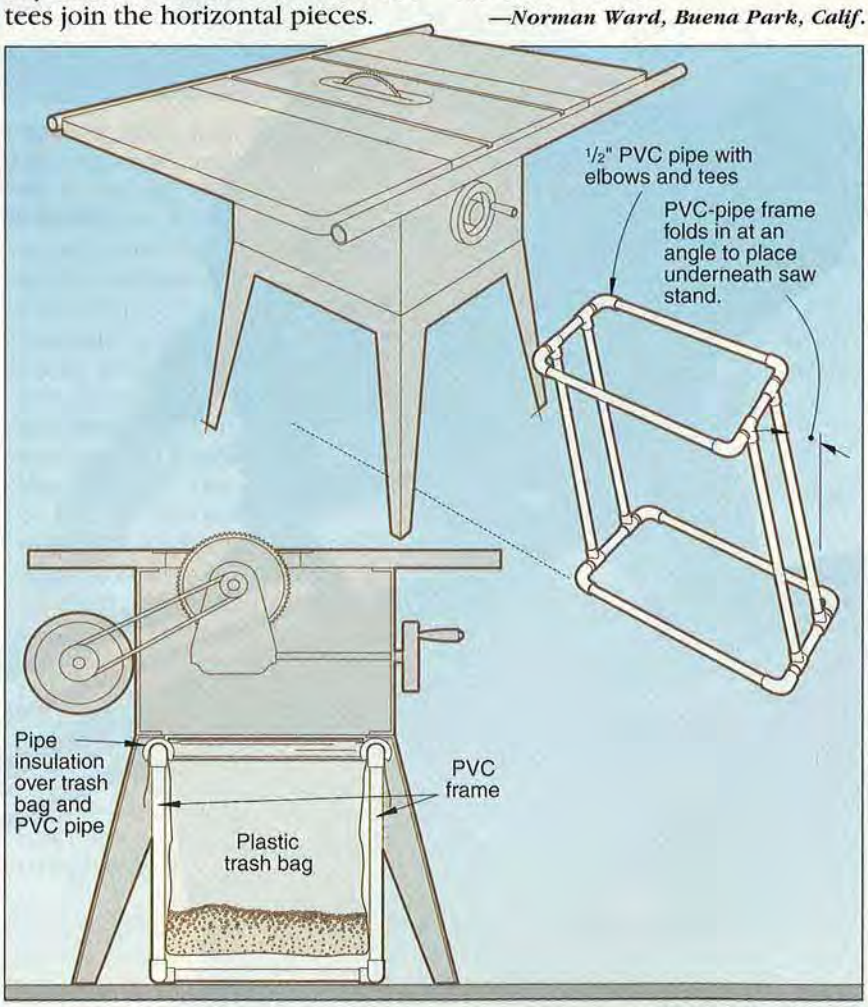
Assemble the frame with elbows, tees, and straight lengths of ½" PVC pipe. You'll need eight elbows and eight tees. Don't use any adhesive, however, where the tees join the horizontal pieces.

For cleaning up top honors, Norman receives a Sears Craftsman 9" two-wheel bandsaw. Nice work, Norman!

TOP SHOP TIP

Drop a trash bag in the opening of the frame and secure it with sections of foam pipe insulation. Bend the frame over to slide it underneath the saw, then pull the frame upright into position. The trash bag captures the sawdust, and the foam pipe insulation seals the frame snug against the bottom of the tablesaw cabinet.

—Norman Ward, Buena Park, Calif.


½" PVC pipe with elbows and tees
PVC-pipe frame folds in at an angle to place underneath saw stand.
Pipe insulation over trash bag and PVC pipe
PVC frame
Plastic trash bag

Continued on page 14

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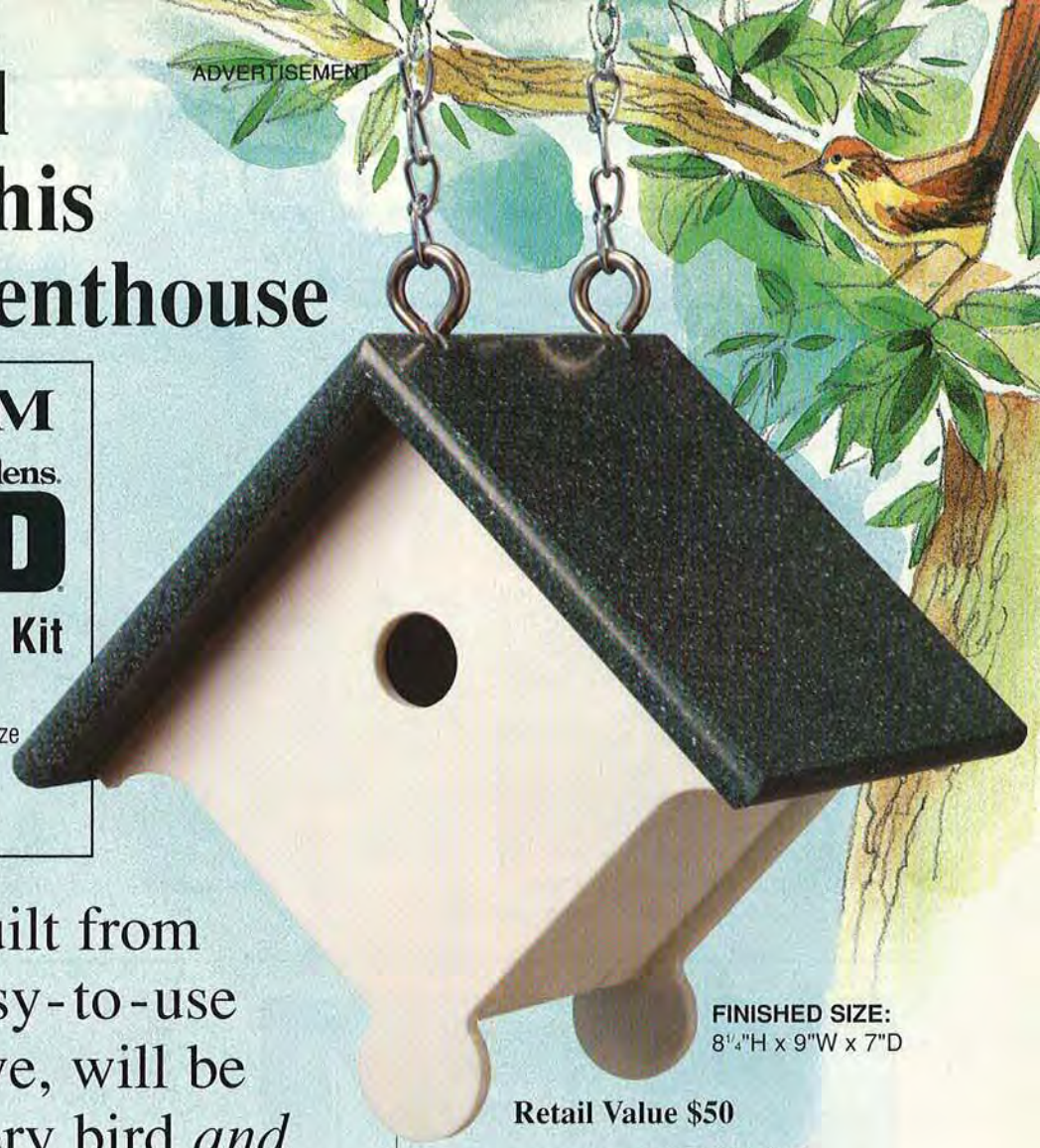

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 12

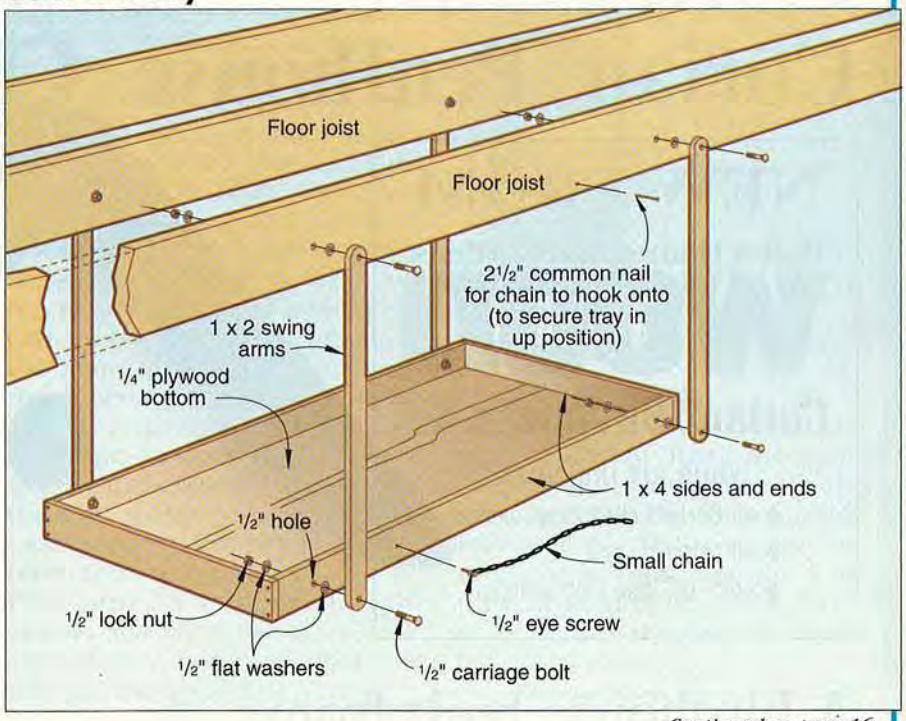
Swinging lumber rack stores out of the way

You can save a lot of floor space by stashing short lengths of lumber between the joists in your garage or basement. And with this rack you can swing the lumber down to eye level where it is easy to sort through and retrieve.

To build the rack, cut four 1×2 swing arms long enough to reach from the middle of the joists to about the height of your chin. Next, assemble the lumber rack from 1×4 stock, and glue and nail a piece of ¼" plywood to the bottom. Make the length about 4' and the width to equal the space between the joists.

Bolt the swing arms to the rack and the rack to the joists as shown *right*. Finally, attach a chain with an eye screw to both sides of the rack so that you can secure it in the upright position.

—Gerry Austin, Guelph, Ont.


Floor joist
Floor joist
2½" common nail for chain to hook onto (to secure tray in up position)
1 x 2 swing arms
¼" plywood bottom
1 x 4 sides and ends
½" hole
Small chain
½" lock nut
½" eye screw
½" flat washers
½" carriage bolt

Continued on page 16

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US Patent #5,038,486

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The Dust Eliminator Workbench pictured with optional manometer gauge.

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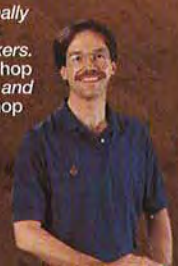

Delta is proud to nationally fund these two PBS programs for woodworkers. The New Yankee Workshop *hosted by Norm Abram and* The American Woodshop *with Scott Phillips.*

THE POWER OF THE PROS

DELTA
WOODWORKING MACHINERY
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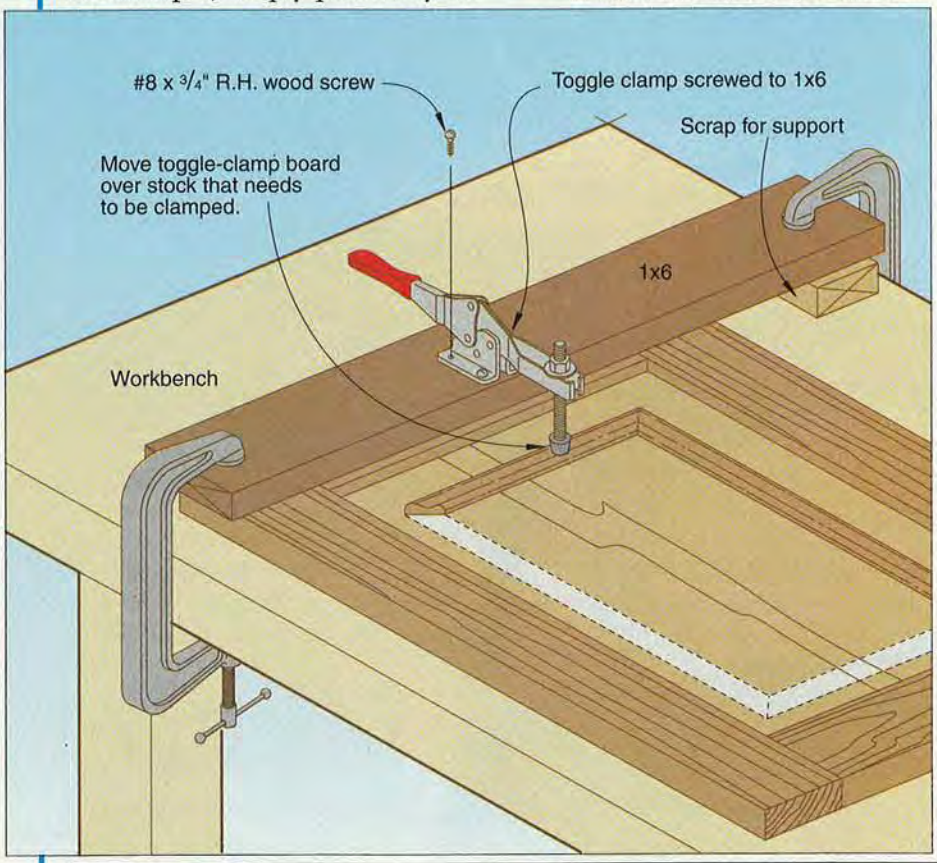
Continued from page 14

Position this toggle-clamp jig almost anywhere

Screw a toggle clamp to a long 1×6, and you can use it practically anywhere you can securely clamp the board. To clamp something in the middle of a panel or bench, for example, simply position your toggle clamp jig where needed, clamp the 1×6 to the edge of your workpiece or bench, and apply pressure to the workpiece with the toggle clamp.

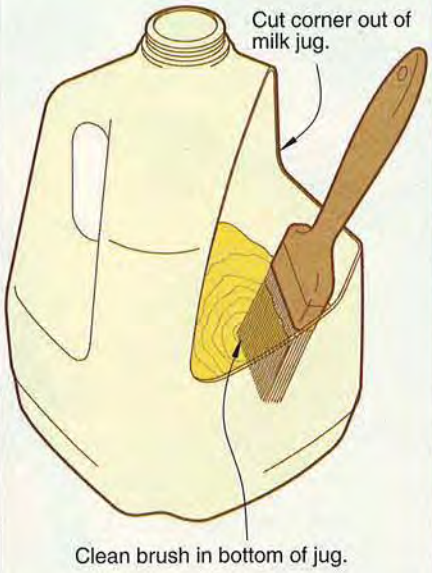
—Chris Strazzeri, Delray Beach, Fla.


#8 x 3/4" R.H. wood screw
Toggle clamp screwed to 1x6
Scrap for support
Move toggle-clamp board over stock that needs to be clamped.
1x6
Workbench

Yet another use for those empty milk jugs

Recycling programs today cart away most of our empty plastic milk jugs, but you may want to hang onto a few to take advantage of this tip. Cut a large opening in the front of the jug, and put solvent in the bottom to clean brushes. When your hands get slippery from paint or solvent, the jug with its handle proves easier to carry around and empty than a large metal coffee can.

—John Regan, Gorham, Maine

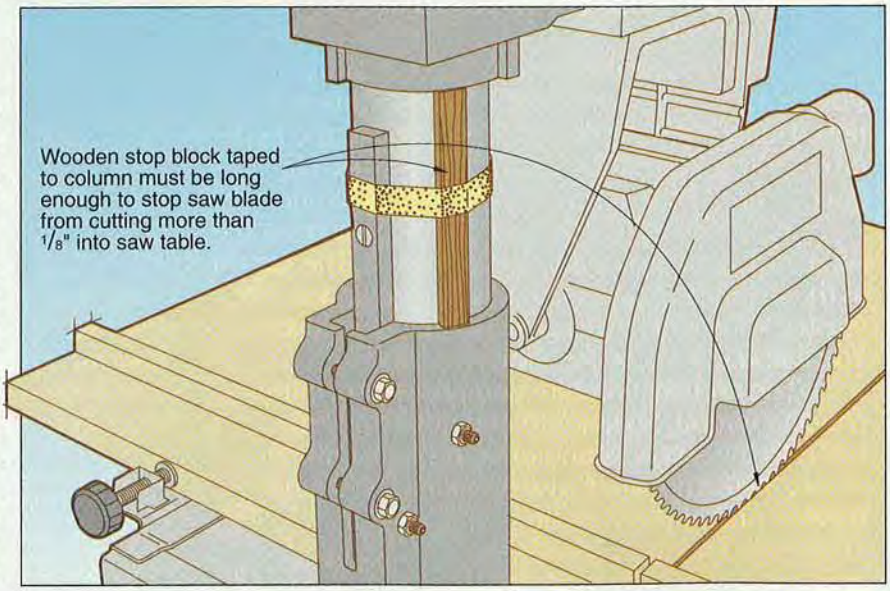


Stop block saves wear and tear on radial-arm saw table

You often don't notice until it's too late. After repeatedly raising and lowering the blade of your radial-arm saw, you've cut a deep kerf in the top of the table and practically ruined it. Solution?

Before you chew up your table, lower the blade to the correct depth, about ⅛" below the surface of the table. Then, tape a wooden block like the one shown in the drawing *right* to the column of your radial-arm saw. Now, whenever you raise and lower the blade, the block will prevent the blade from digging deeper than you want into the table.

—From the WOOD® magazine shop



Continued on page 18

FOR THOSE WHO AREN'T WILLING TO SETTLE FOR "ALMOST."

"Almost Delta." That's like saying your next project will turn out almost right. Or that you'll be satisfied with "not too bad for the money."

Now before you tear into your next piece of walnut or oak with something less than Delta, remember this: A professional would tell you to buy the best band saw or table saw or jointer you can afford. Probably even tell you to buy the Delta, same as he did. Because you can't afford not to.

But here's what we'd suggest: Go out and shop any of the tools you see here. Run some stock across our Deluxe 6" Jointer. Compare our Contractor Saw or 14" Band Saw straight up with the competition. Look, really look at the details. Then ask yourself how you'd like to invest your money.

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TIPS FROM YOUR SHOP (AND OURS)

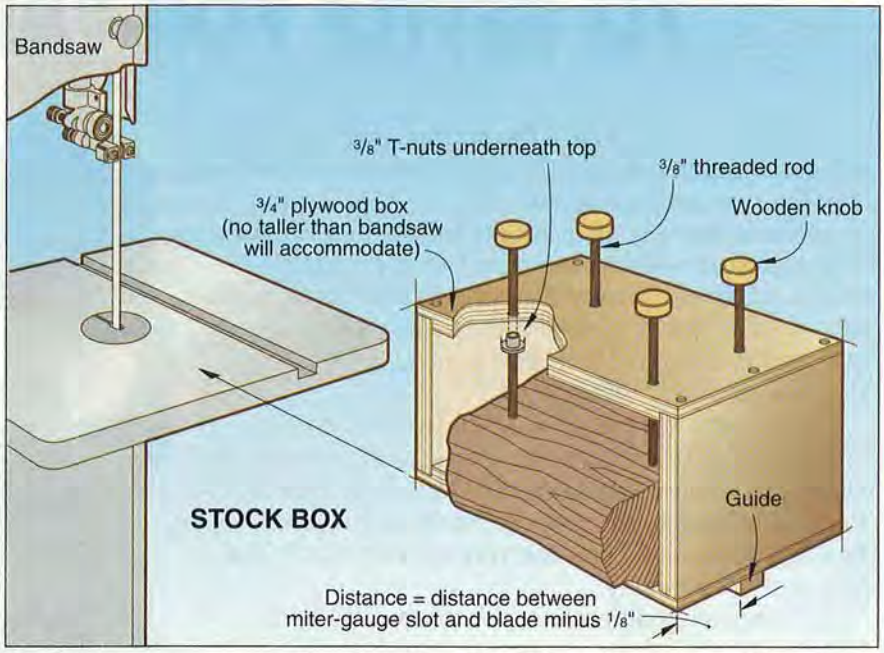
Continued from page 16

Stock box steadies forest-found treasures for ripping

Have you ever found a beautiful chunk of burl or crotch wood in the forest, but didn't know how to cut it? Build this box to hold your found wood steady for ripping on the bandsaw.

Size the box so it clears the guide blocks on the bandsaw. Cut the sides, bottom, and top from ¾" plywood. Install ⅜" T-nuts in the top as shown, and glue and screw the plywood pieces together. Then, glue and screw a guide to the bottom of the box that fits the miter slot as shown.

Cut four wooden knobs with a hole saw, and drill ⅜" holes, ⅝" deep centered in the knobs. Glue the threaded rods into the holes with epoxy. Put your found wood in the box with the portion you want to cut sticking out. Run the threaded rods through the T-nuts in the top to secure the found wood, and push the box past the blade. Use a blade that's at least ½" wide with no more than three teeth per inch.


Bandsaw
⅜" T-nuts underneath top
⅜" threaded rod
¾" plywood box (no taller than bandsaw will accommodate)
Wooden knob
STOCK BOX
Guide
Distance = distance between miter-gauge slot and blade minus ⅛"

—Kenneth Ray, Los Osos, Calif.

Continued on page 20

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2 1/2X16	.85 ea	4X24	1.10 ea
3X18	.86 ea	4X36	1.35 ea
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3X23 3/4	.93 ea	6x89	6.24 ea

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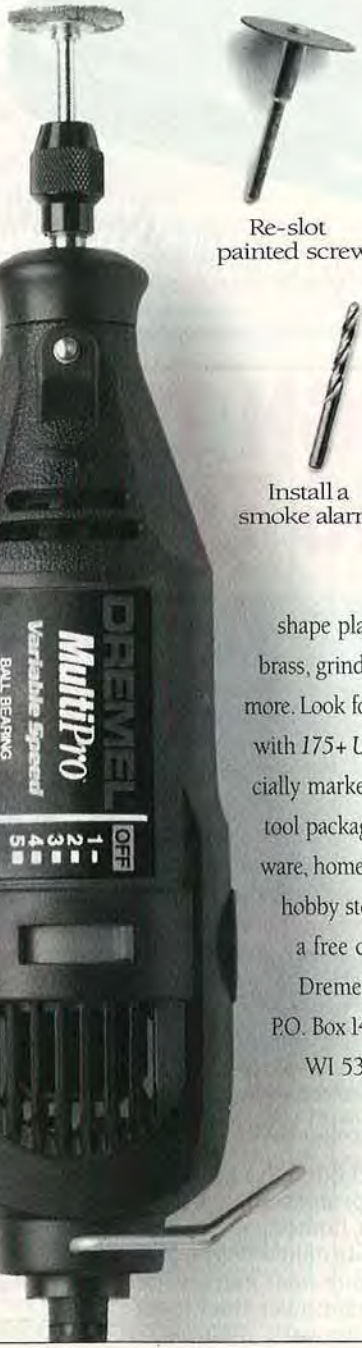

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DREMEL®
MultiPro
HIGH-SPEED ROTARY TOOL

TIPS FROM YOUR SHOP (AND OURS)

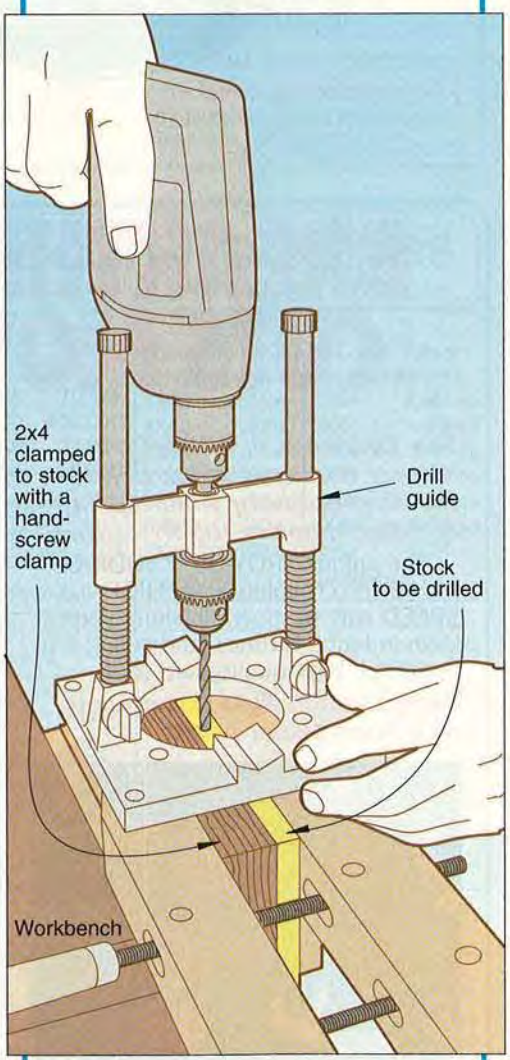
Continued from page 18

Add an extra piece of stock to steady drill guide

Drill guides that attach to the shaft of a portable electric drill sometimes wobble when you're trying to drill a hole into the end or edge of a thin board. Here's a quick solution.

With a handscrew clamp, secure a flat, square piece of scrap stock flush with the edge or end of your workpiece, as shown *below*. Position the clamp flush with the top of the workpiece and the scrap stock. The clamp and scrap stock provide extra surface area to stabilize the drill guide, and that enables you to drill straight holes with confidence.

—Clement S. Barlow, Brielle, N.J.



Continued on page 22

BOSCH

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1194VSR	1/2" VSR, 2 STAGE HAMMER DRILL	145
1272D	3" X 24" DUSTLESS BELT SANDER	208
1273D	4" X 24" DUSTLESS BELT SANDER	214
1273DVS	4" X 24" VS DUSTLSS BELT SANDER	229
1370DEVS	6" VS DSTLS RNDM ORB SNDR	234
1584VS	CLIC BARREL HANDLE JIG SAW, VS	148
1584VSW	1584VS JIG SAW W/CASE & 10 BLADES	169
1584DVS	BARREL HANDLE JIG SAW, DUSTLS	189
1587VS	TOP HANDLE JIG SAW, VARSP	148
1587VSW	1587VS JIG SAW W/CASE & 10 BLADES	169
1587DVS	TOP HANDLE JIG SAW, DUSTLESS	189
1604A	ROUTER	142
1608	LAMINATE TRIMMER	97
1609KX	DELUXE INSTALLERS KIT W/4 BASES	229
1613EVS	2 HP VAR SP PLUNGE ROUTER	198
1613EVSK	1613EVS 2W/RA1051 DELUXE EDGE GUIDE	209
1614EVS	1 1/4 HP VAR SP PLUNGE ROUTER	158
1615EVS	3 1/4 HP VAR SP PLUNGE ROUTER	289
3051VSRK	9.6V CRDLS KIT W/2 BATT KEYLESS	139
3725DVS	5" DUSTLESS VS RANDOM ORBIT SANDER	149
3727DVS	6" DUSTLESS VS RANDOM ORBIT SANDER	154
B1650K	BISCUIT JOINER KIT	154
B4050	*NEW* IN LINE GRIP JIGSAW	113
B7000	TRIANGULAR CORNER SANDER	68
B7000A	B7000 W/EXTENDER PAD & 12 SHTS PAPER	79
B7001	VAR SP CORNER SANDER	91
B7001A	B7001 W/EXTENDER PAD & 12 SHTS PAPER	102
3300K	12V CRDLS VSR DRILL W/2 BAT, CS & CHRG	193
3310K	12V CRDLS W/T HANDLE W/2 BAT, CS & CHRG	197
3220	9.6V CORDLESS IMPACT DRIVER KIT	194
3500	12V CORDLESS HAMMER DRILL KIT	197
3054VSRK	12V CORDLESS KIT W/2 BAT, CASE	185
B2300K-06	12V CRDLS DRILL KIT W/2 BATT & LIGHT	174

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TR12	3 HP PLUNGE ROUTER	192

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332K	332 W/CASE & 100 SHEETS PAPER	94
333	QUIKSAND W/HOOK & LOOP, DUSTLS	74
333K	333 W/CASE & 50 SHEETS PAPER	102
334	QUIKSAND W/STIKIT, DUSTLESS	74
334K	334 W/CASE & 100 SHEETS PAPER	102
340	1/4 SHT FIN SANDER W/DUST P/U	49
345	SAW BOSS 6" CIRCULAR SAW	104
347K	7 1/4" FRAMERS SAW, 15 AMP WITH CASE	127
351	3" X 21" BELT SANDER	156
352	3" X 21" BELT SANDER W/DUST BAG	162
352VS	3" X 21" BELT SANDER DUSTLESS W/VAR SP	165
360	3" X 24" BELT SANDER W/DUST BAG	197
361	3" X 24" BELT SANDER	189
362	4" X 24" BELT SANDER W/DUST BAG	206
363	4" X 24" BELT SANDER	199
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690K	690 W/CS, EDGE GUIDE, & TEMP GD KIT	189
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691K	691 W/CASE, EDGE GD & TEMP GD KIT	209
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9345	SAW BOSS 6" CIRCULAR SAW KIT	127
9444	PROFILE SANDER KIT WITH ACCESSORIES	113
9447	7 1/4" CIRC SAW W/BRAKE & CASE	158
9647	TIGER CUB RECIP SAW KIT	118
9737	RECIPRG TIGER SAW, 9.6A, QUICK CHNG CHUCK	159
9843	7 1/4" LEFT SIDE SAW W/BRAKE & CASE	158
9853S	12V CRDLS KIT W/2 BAT, CASE	163
97310	LAMNT TRIMMR KIT W/3 BASES & CS	184
97335	5" RANDOM ORBIT SANDER W/CASE	129
97336	6" RANDOM ORBIT SANDER W/CASE	134
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DW443	6" ROS SANDER VAR SP, VELCRO	139
DW444	SAME AS ABOVE WITH PSA PAD	139
DW610	1 1/2 HP ROUTER, 9 AMP	148
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TIPS FROM YOUR SHOP (AND OURS)

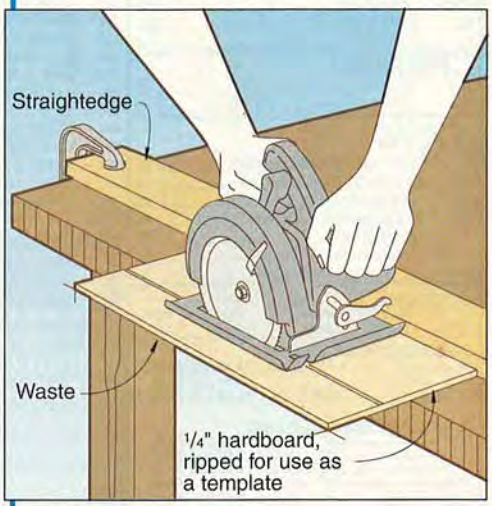
Continued from page 20

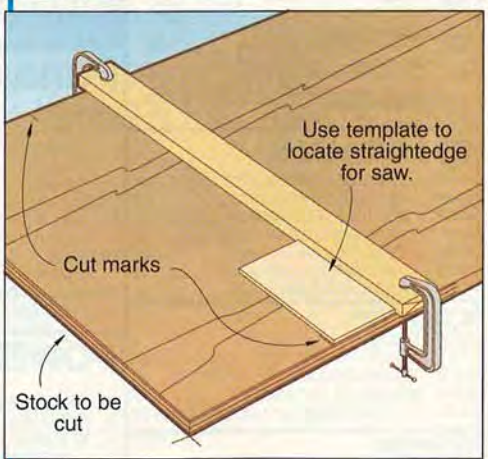
Hardboard template ends inaccurate fence settings

When making cuts with a portable circular saw, setting the distance from the straightedge to the edge of the baseplate often takes time and multiple measurements. To simplify this procedure, rip a hardboard template as wide as the distance from the edge of the baseplate to the inside edge of the sawblade. Then, crosscut the hardboard to the length of the saw's baseplate.

To use the template, place one edge on the cut mark of the workpiece, slide the straightedge for your circular saw snug to the other edge, and clamp. Repeat this procedure at the other cut mark. You also can make these templates for your jigsaw or a router and straight bit.

—Dave Bovey, Simi Valley, Calif.



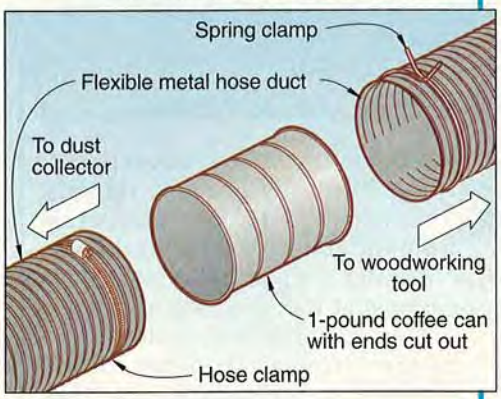


Brew up a solution for vacuum-hose connections

Looking for a better way to hook up sections of 4" flexible dust-collection hose? The solution is percolating in your pantry!

The next time you empty a one-pound can of coffee, cut the bottom off and use the can as a coupler. The rolled steel edges of the can prove much stronger than the crimped hose connectors sold in stores. Attach the hose leading to the duct collector with a screw-type hose clamp, and if you want a quick-change fitting, connect the hose leading to the tool with a 4" spring clamp.

—Earl Frech, North Canton, Ohio



A FEW MORE TIPS FROM OUR WOODWORKING PROS

- To prevent a brad from splitting your wood, snip the head off one and use it to drill a pilot hole. See how we did this to hold the mirror in its frame on *page 49*.
- Do you have a project with an arched top, but don't know how to make the arch? Check out the method we used to assemble a rectangular frame and cut the arch on *page 48*.
- You can use a router and straightedge to rout decorative patterns in plywood just like we did on the playhouse roof. Find out how to employ this technique on *page 62*.

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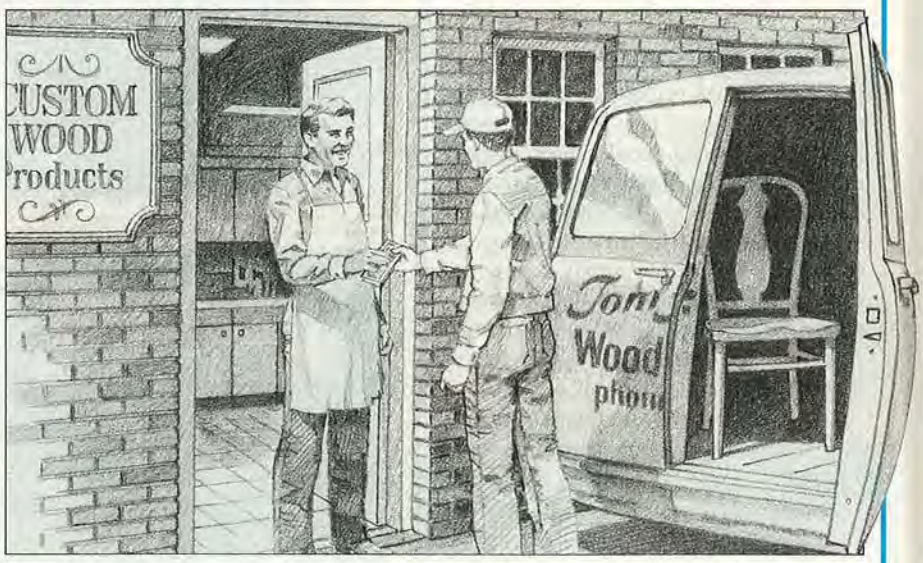

When J. Richard Whiteside retired as a Presbyterian minister in 1987, he decided to expand his woodworking hobby by selling some of his handiwork. His first steps were into the shops of some local professional woodworkers.

Those chats with the pros led to some contract work from them, including refinishing and chair repair. And that work was the beginning of Dick Whiteside's Wood Shop in West Chester, Pennsylvania, where Dick works at his own pace in a business situation he describes as somewhere between hobby and active post-retirement. "Now, I use other shops more than the other way around," he comments. "Because I don't do wood turnings, I have others do them."

How to talk shop with the pros

Dick Whiteside's approach represents one good way you can make the transition from hobbyist to professional. Here are two more angles that will help you work yourself into a paying position that gives you the chance to build your skills and reputation:

• ***Sell complementary products.*** Cabinetmakers, for example, may want jewelry boxes or other "smalls" to complement their product line. This is particularly true if the cabinetmaker has a showroom, store, or catalog. Chairmakers, for instance, can find a good market this way because many cabinetmakers prefer not to make chairs. Yet, people would buy them if they had them to display and sell.

• ***Offer your services.*** You might serve as a standby subcontractor when the woodshop has more work than it can handle. Or, you might offer expertise the woodshop doesn't have, such as finishing, turning, or carving.

Established woodshops benefit from working with independent woodworkers. That's because finding good entry-level or skilled employees is a major problem for many professional shops. Besides, subcontractors don't increase the shop's overhead, benefits, and payroll costs.

Tips on building the right relationship

Finding a subcontractual relationship with an established woodworker may be easier than you think, and usually easier than developing your own consumer business. Simply call the woodworking pros in your area to tell them what you have to offer. Then, arrange a follow-up visit to show them your work.

After working with other shops for awhile, you may be ready to launch your own enterprise. Don't burn any bridges, though. You may want future referrals from the shops you did work for.

Making a friendly break later is easier if at the very beginning you discussed what both sides could expect from each other. Some professionals don't mind letting their customers know about their subcontractors; others jealously guard such information.

As a subcontractor, you can avoid hard feelings of your own by checking around to make sure that you're getting a fair market price for your work. Keep in mind that the retail markup is usually 100 percent over wholesale, and that you'll only get a fraction of what the woodshop actually charges its customers.

Working for other woodworkers won't net you as much money as striking out entirely on your own. Still, what you gain in woodworking experience and marketing power can make working with woodshops a good deal.

Written by Jack Neff, a Batavia, Ohio, business writer and author of the book *Make Your Woodworking Pay For Itself.*

Illustration: Jim Stevenson

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ASK WOOD

Whether your woodworker's license reads "Beginner," "Intermediate," or "Advanced," you're bound to have a few questions about your favorite hobby. We can help by consulting our staff and outside experts. Send your questions to Ask *WOOD*®, *Better Homes and Gardens*® *WOOD* Magazine, 1912 Grand Ave., Des Moines, IA 50309-3379. *CompuServe:* 74404,3516 (or) *Internet:* 74404.3516@compuserve.com

Sure, you can flat-plane with a jointer

I am thinking of purchasing a jointer for my shop. Never having owned one of these machines before, I am wondering if I could run boards facedown through the machine to remove the saw marks left from resawing?

—Paul F. Blum, Lyons, N. Y.

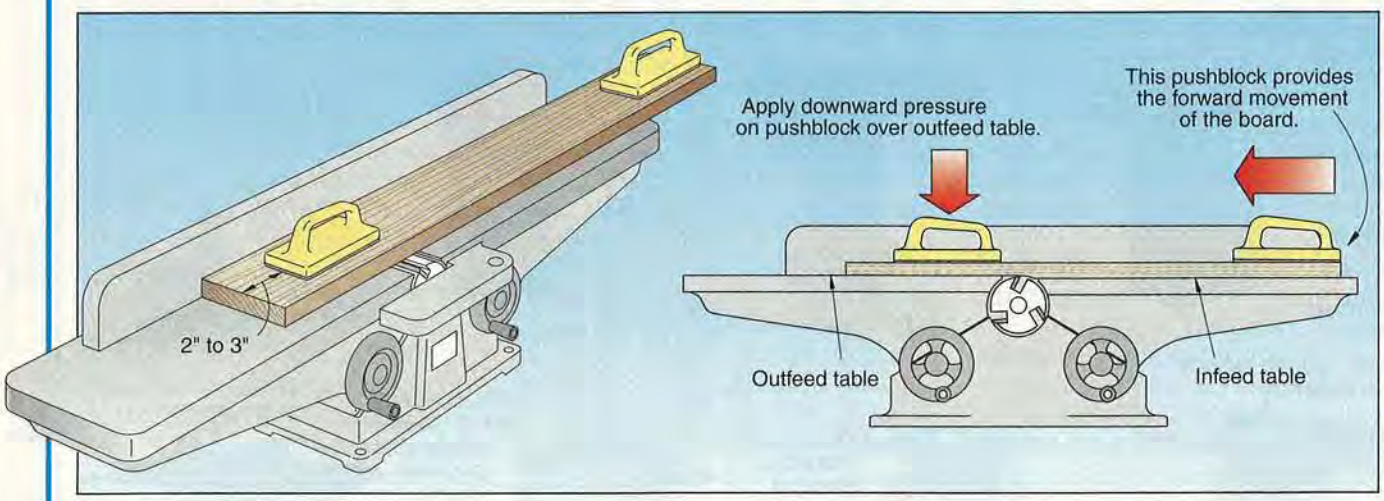
You can flat-plane the face of a piece of wood on a jointer, Paul, provided the board is narrower than the jointer cutterhead. To do this safely, you will need two pushblocks to guide the board across the jointer knives. Here's how it's done:

1 Place the board you want to flatten face side down on the infeed table. Adjust the machine to take a light cut (1/16" or less). Start the machine.

2 Slowly feed the board into the spinning cutterhead with pushblocks. Place the lead pushblock on top of the board, 2" to 3" back from the leading edge of the board. Place the second pushblock on the trailing end of the board (see drawing *below*)

3 Maintain downward pressure on the leading pushblock as the board passes over the jointer cutterhead. This holds the planed portion of the board flat to the outfeed table. Use your second or trailing pushblock to move the board forward (see drawing *below)*

We recommend that you use a thickness planer for cleaning up the rough faces if the resawn boards are 3/8" or less in thickness. Place these resawn pieces on a 3/4"-thick backing board to provide support as they pass through the planer. Secure the wood to the backing board with double-sided tape.


2" to 3"
Apply downward pressure on pushblock over outfeed table.
This pushblock provides the forward movement of the board.
Outfeed table
Infeed table

What size of jointer should I buy?

I am considering purchasing a jointer. Some woodworker friends have told me that after using a 6" jointer, they would prefer an 8"-wide machine. What are the advantages of each?

—John Mullins, Rhoadesville, Va.

John, we use an 8" jointer in our shop here at *WOOD* magazine, so that tells you the preference of our project builders. The greater width of the 8" jointer allows it to flat-plane wider boards than the smaller machines. And these larger jointers have longer infeed and outfeed tables, allowing for easier and more accurate edge-jointing of a long board. Add to this the larger motor and the greater weight of the 8" machines, and you generally have a more powerful and smoother-running tool than their smaller 6" cousins.

However, these machines do have some drawbacks. They cost substantially more than the 6" jointers, and most of the 8" jointers need to be run on 220-volt current.

If you have limited room in your shop, you will appreciate the smaller size of the 6" jointer. And it's easier to move because of its lighter weight. Properly tuned and adjusted, these smaller jointers will cut a gluing edge that rivals those of the 8" jointers. And although the boards that will be flat-planed need to be less than 6" in width, that's the maximum width of board we recommend edge-gluing into a panel.

Continued on page 28

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ASK WOOD

Continued from page 26

A sure cure for broken rocker spindles

My antique child's rocker came out of an auto accident with the four upright back spindles broken off at the top and bottom where they enter the seat and back rest. Short of turning new spindles, what can I do to repair this rocker?

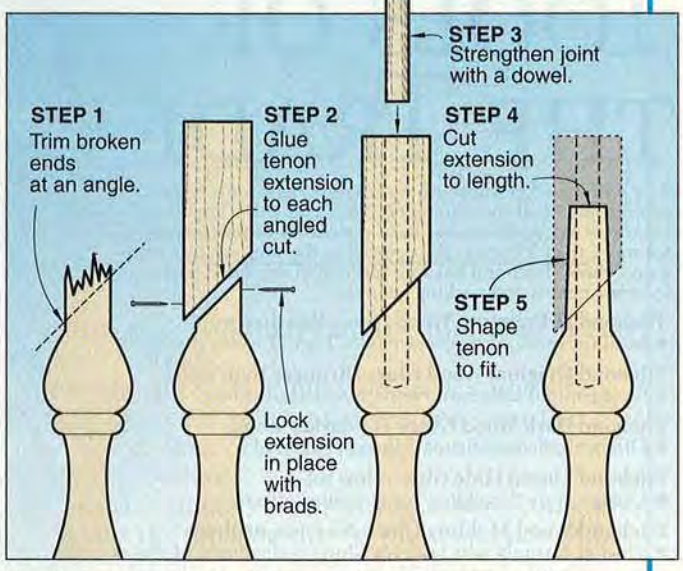
—James F. Frye, Hendersonville, N.C.

Jim, we suggest you graft new ends onto the spindles, retaining as much of the original wood as possible. Here's how to do it:

1 Trim off the broken ends with a handsaw, making the cut at an angle for maximum gluing surface (see drawing Step 1). Sand this cut on a flat surface for the best joint fit.

2 From the same type of wood as the spindle, make an oversized, square extension with an angled face matching the angle you cut on the spindle (see drawing Step 2). Fasten this extension to the spindle with wood glue. Use two wire brads to lock the extension in place while clamping, and remove the brads after the glue dries.

3 Drill a dowel hole (equal to ½ the diameter of the spindle tenon) lengthwise through the extension and into the spindle. Glue a matching-sized dowel (kerfed along its length) into place to strengthen the joint, and allow the glue to dry.



4 Cut the extension to length, and shape it to match the original spindle, using a carving knife and rasps. Sand the joint and extension, and finish to match the original color of the spindle.

Continued on page 30

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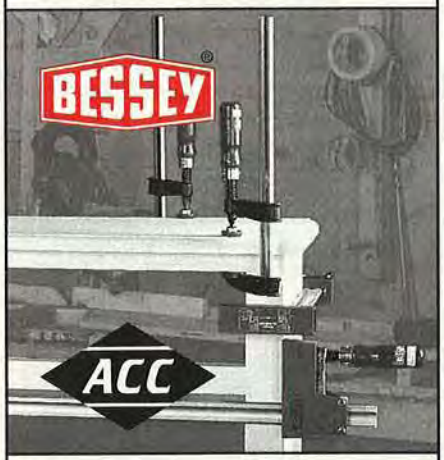

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ASK WOOD

Continued from page 28

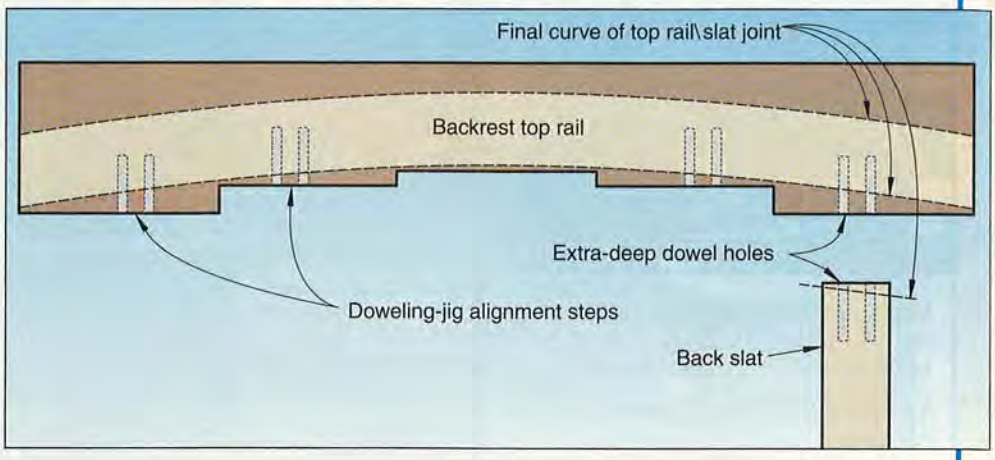
How to dowel a curved joint

I am building a bench backrest that has a curved top rail. I want to use a doweling jig to drill the dowel holes for the backslats, but I can't figure out how to align the jig on the curved surface. Do you have any suggestions ?

—Louie Rebideaux, Sparks, Nev.

Louie, to use dowels to reinforce an angled or curved joint, we suggest that you first cut the backrest top rail with flat steps at the location of each slat. This will allow you to set the doweling jig perpendicular to the bottom of the rail. Drill the dowel holes ½ to ¾" deeper than normal. Then, cut the top rail to its final shape after drilling the holes.

Next, cut the back slats approximately 1" longer than needed. Drill extra-deep dowel holes in the ends of the back slats before cutting the joint angles or curves to match the top rail. Dry-fit the slats to the backrest top, holding them in place with dowels. Then measure, mark, and cut the bottom of the slats to length. Drill and dowel the slat bottoms to the bottom rail. As always, dry-fit and clamp the entire bench back to check the joint fit, and make any necessary joint adjustments before gluing.



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310	Laminate Trimmer	143
312	Offset Trim Router	157
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347	7" Circular Saw	128
743	7" Left hand saw	128

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5116	16" Dovetail Jig	256
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6615	1/2" Keyless Drill	132
666	3/8" Drill	124

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7403	7" Sander	178
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5007NBK	7-1/4" Circ. Saw	127
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5090D	tool only	80
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6211DWHE	NEW Cordless	194
6311DWHE	NEW Cordless	204
6406	3/8" Drill	53
9820-2	Sharpener	208
9901	3 X 21 Belt Sander	129
9924DB	3 X 24 Belt Sander	183
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JR3000V	Recip-Saw	138
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0236-1	1/2" Magnum Kit	154
0238-1	1/2" 0-850rpm Drill	128
0239-1	1/2" Keyless Drill	128
0244-1	0-600 rpm Magnum	130

0375-1	3/8" Close Qtr Drill	134
0379-1	1/2" Close Qtr Drill	148

0407-1	Cordless Drill Kit-2batt	172
0422-1	12V Cordl's HammerDrill	245
0567-1	Drain Cleaner	234
3300-1	Rt Angle Drill	193
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6546-1	2 spd Inline Screwdriver	81
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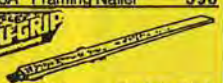

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2660	Drywall Screwgun	86
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2721	1.5hp Router 1/2" collet	148
3105	Reciprocating Saw	148
3339	3hp VS Plunge Router	268
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32-100	Plate Joiner	254
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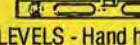

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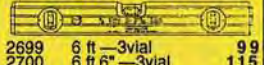

2699	6 ft —3vial	99
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RJ100VK	Reciprosaw	99
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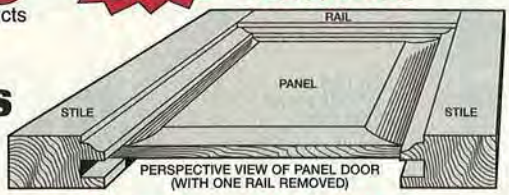

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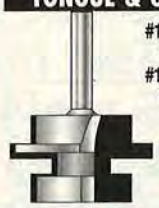
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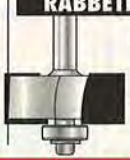
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THE WORLD'S LEADING WOODWORKING MAGAZINE
APRIL WOOD 1996

WESTERN WHITE PINE

The West's mountain-climbing conifer

If ever a tree loved to live in the mountains, it's the western white pine. You'll find it getting along quite happily in the high country of California, Idaho, Montana, Oregon, Washington, and British Columbia.

Given western white pine's preference for altitude, it may seem strange that this species ranks among the most important timber trees of North America. The tree's size and wood quality make the extra logging effort worthwhile. Even Scottish explorer and botanist David Douglas, who discovered the western white pine on the slopes of Washington's Mt. St. Helens back in 1825, thought it important to send some seeds to his homeland. Today, the products of those seeds grow majestically in the highlands of Scotland and Ireland.

Commercially, western white pine commands one of the highest prices of all softwoods. It's in continued demand for window and door frames, molding, and high-quality veneer for plywood.

Wood identification

Western white pine (*Pinus monticola*) thrives in the deep porous soils of north-facing mountain slopes where the snow gets deep and the growing season stays short. That's why northern Idaho produces about two-thirds of the U.S. supply. In the industry, it's even called Idaho white pine.

Despite the rigors of climate, specimens reach 175' in height with diameters of 8' at breast height. The silvery-gray trunks of mature forest trees usually have no branches for half or more of their height.

Unlike its eastern cousin, which has a crown of widely spreading branches, western white pine has a short-branched, narrow, yet symmetrical crown. But, like eastern white pine, the pale, bluish-green needles of western white pine grow in bunches of five. Slender, slightly curved cones grow to a length of about 12".

Under each scale of the cone lie two tiny seeds. In September and October the cones ripen and open to shed them.

The straw-colored wood of Western white pine weighs 26 pounds per cubic foot air-dry, and in strength and hardness compares with Douglas fir. Straight grain and even texture means that it works easily. The choicest western white pine boards come from Idaho and carry the grade stamp IWP, for Idaho White Pine.

Natural range

Uses in woodworking

Besides millwork, you can use western white pine for indoor furniture, cabinets, and shelving units, as well as light construction. For carving, it is somewhat harder than eastern white pine, but holds detail equally well. You also can turn the wood.

Availability

You should find the better grades of western white pine (Choice & Better, and Quality) in the board section of home centers and lumberyards. Boards should have the stamp mark MC-15, meaning that they have been kiln-dried to 15 percent moisture content or less. Expect to pay $2 or more per board foot. As plywood, you'll pay $50 for a premium ¾" sheet.

Continued

PERFORMANCE PROFILE

western white pine
(Pinus monticola)

Western white pine

The boards you buy may carry the additional "IWP" grade-stamp imprint. If so, you'll have some of the best pine available, with very few knots. But western mills don't kiln-dry softwoods to a low moisture content of 8 percent that you typically find in hardwoods. By industry standards, your pine may have as much as 12–15 percent moisture, which is okay if you let the wood acclimate in your home for a week or so to stabilize it before using. Then, you'll want to keep the following tips in mind when working western white pine.

Machining methods

Although pines are considered softwoods, some species are harder than others. And that's the case with western white pine. The wood rates as 30 percent harder than eastern white pine, and although you can successfully work it with hand or power tools, be sure you keep all tool cutting edges sharp.

- Unlike many other species of pine, western white pine boards have little pitch in them to build up on your saw blade. Still, it does occur, so avoid the burning and blade wander that accompanies gum buildup by using a Teflon-coated blade or occasionally cleaning the blade with steel wool dampened with acetone.
- This wood doesn't splinter easily, but a backing board helps reduce the chance when routing across the grain.
- Due to the hardness of western white pine, you'll want to drill pilot holes for screws.
- The better grades of western white pine will only have small, tight knots known as "pin knots." They won't fall out, but to prevent bleed-through, you should seal them with shellac before applying a clear or painted finish.
- If you plan to stain the wood, first put on a sealer coat of wood conditioner or diluted shellac (cut 50 percent with denatured alcohol) to prevent unevenness of the stain color.

Carving comments

- The hardness of western white pine doesn't vary from earlywood to latewood as with other pines or firs. This even texture means the wood will take detail without chipping or splintering.
- For sculptural carvings, pin knots may add character since the wood is otherwise featureless. But be sure to seal them.

Turning tips

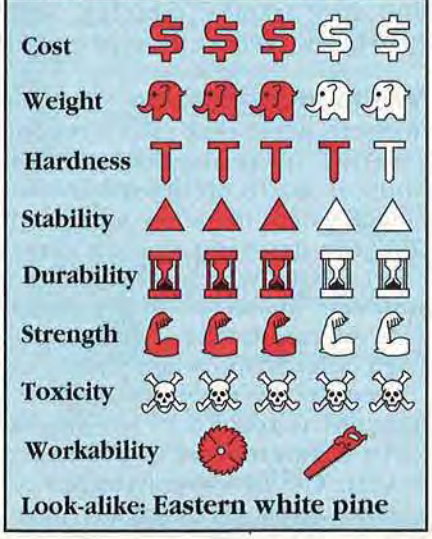
- Thick stock blanks of western white pine may contain pitch pockets deep inside. If the pockets haven't dried, droplets of pitch can appear on a freshly turned surface. Just scrape them off after they harden, then finish the wood.

SHOP-TESTED TECHNIQUES THAT ALWAYS WORK

Any exceptions—and tips pertaining to this issue's featured wood species—appear under other headings you'll find elsewhere on this page.

- For stability in use, always work wood with a maximum moisture content of 8 percent.
- Feed straight-grained wood into planer knives at a 90° angle. To avoid tearing, feed figured or twisted grain at a slight angle (about 15°), and take shallow cuts of about 1/32".
- For clean cuts, rip with a rip-profile blade having 24–32 teeth. Smooth cross-cutting requires at least a 40-tooth blade.
- Avoid using common twist drills in woodworking. They tend to wander in the wood and cause breakout. Use brad-point bits and a backing board under the workpiece to reduce tearout.
- Drill pilot holes for screws.
- Rout with sharp, preferably carbide-tipped, bits and take shallow passes to avoid burning.
- Carving softwoods generally means using fairly steep gouge bevels—20° or more—and taking deeper cuts.

WESTERN WHITE PINE AT A GLANCE



Look-alike: Eastern white pine

Compiled with woodworkers Rick Marple and Jerry Neene Illustrations: Steve Schindler

TEACHER/TOYMAKER

Carrying on a tradition in wood

"Some retirees seem so empty. I think they miss a purpose in life—golf, travel, and TV just aren't enough," says Gus Stefureac, shrugging his laborer-like shoulders. That's why before Gus retired from IBM, where he had been an electronics technician for 35 years, he was determined that his woodworking hobby would become a business.

Now, 10 years later at age 65, Gus' biological gas tank never runs empty. He approaches every day with the vigor and vitality of someone a fraction of his age. If he's never been busier, he's never been happier either. Gus Stefureac may call Raleigh, North Carolina, home. But in his golden years, the woodworking world is definitely his oyster.

Continued

Once a year, Gus volunteers a week of his time to teach woodworking to kids. Read more about it on *page 38*.

TEACHER/TOYMAKER

Depression-era Detroit was Gus' childhood stomping ground. There was only money for essentials: food, clothes, and housing. But Gus doesn't remember the 1930s as bad times. On the contrary, those days were his introduction to woodworking.

"We made all of our own toys from scrap 2×4s and whatever else we could find," he says. "To an orange crate or apple box we'd nail a pair of sidewalk skates fastened to 2×4s for a pushcart. That hand-made creativity seems to be missing with kids today."

The thought brings Gus to his favorite topic, wooden toys. "Kids have been brought up with battery-operated toys and electronic games, and parents are really getting fed up with it, at least many of them are," says the craftsman. "That's why when I make a wooden toy based on something from the past, they think it's revolutionary because they haven't seen anything like it."

Gus glues the patterns to the yellow-poplar stock with old-fashioned flour-and-water paste. The design he's cutting is his four-pack train set.

Simple toys make perfect playthings

"Quality Woodcrafters," the business that Gus founded in his retirement, has a double-garage-sized woodworking shop as its base. The leased space is in a light-industrial park a few minutes drive from Gus' Raleigh home. In his peak working season—the four months before Christmas—he's often there until the morning's wee hours.

Brushing off sawdust from a stool, Gus sits down and starts explaining the popularity of his wooden toys. "My customers like them mostly because they're simple. Kids, and parents, appreciate the ease of playing with them. Like finger tops. You should see the amazement on the children's faces when they see that little stick going around and around and around. They play to see whose top can go the longest."

Around Raleigh, antique-shop owners, used-book-store proprietors, and flea-market vendors alike know Gus by name. They know that he's always on the prowl for surviving toys of yesteryear or books about them. "I do a lot of research and shopping for examples of old wooden toys on which to base designs," says Gus.

Yet, according to the toymaker, just being old isn't enough for a toy or game to qualify for revival. Gus has a stipulation. "Every toy that I make requires some manipulative skill. I don't make things that you just look at," he says. "The child either has to take them apart or assemble them. It's also a rule of thumb that anything with movement always stimulates a child's interest."

The best-selling item in Gus' line is a functional item, but it has learning ways as a toy. And he didn't seek it out, it came to him. He calls it, simply enough, the puzzle footstool.

"It was over 10 years ago. I was doing a craft show on the Mall in

Pedal faster in the morning: the earliest variable-speed

In his travels to scrollsaw demonstrations, teaching stints (see *page 38*), and craft fairs, Gus always has his eyes peeled for antique, pedal-powered scrollsaws. He has collected nearly a dozen of them, rescued from basements, sheds, and garages where they had collected dust.

"I clean them up, fix them if necessary, and use them to demonstrate what scrollsawing was like a century ago," Gus notes. "Some of them are real works of art, but in all cases they're a novelty. People like them and laugh when I tell them that back then you never saw fat craftsmen because they pedaled away all day long. One time at the North Carolina state fair, a lady asked me if the pedal saw I was using had variable speed. 'Yes, ma'am,' I said, 'it goes faster in the morning!'"

Gus takes his scrollsawing seriously, though. And he's quite the historian. "The hand-held fretsaw was the forerunner of the scrollsaw," he points out. "Then in 1870, the Barnes company of Rockford, Illinois, came out with the first pedal-powered model in the United States."

"The electric-powered scrollsaw really evolved in the Black Forest of Germany where craftsmen used them to cut out clock parts," Gus continues. "Today's scrollsaw revolution started when Hegner brought over a power scrollsaw that could cut a 2"-thick piece of wood. Yet, the arm assembly of the Hegner saw—the parallel arm—is exactly the same as the old Barnes' saw."

Gus, who sells Hegner scrollsaws at his seminars and demonstrations, isn't unbiased. Yet he is sincere in his belief that the scrollsaw has done more to advance woodworking as a hobby than any other tool. That's because anyone—man, woman, child—can

safely saw and create satisfying projects with one.

"There's really nothing new in the woodworking world today," notes Gus. "For instance, I adhere my patterns to the stock with the same flour-and-water paste that was used 100 years ago! And that paste you can run right through the sander. But if the paste sits a couple of days, though, bacteria growth begins. Adding a dash of baking soda retards that."

Just as Gus borrows from the past, he may be a part of the future. He sees toys that he made two decades ago at flea markets around Raleigh. That gives Gus a good feeling. "In life, we're here for awhile, we work, and we die," he reflects. "But with these toys, a part of me may live forever."

At the height of their popularity in the late 1800s, scrollsaws came in a variety of models from a dozen or more manufacturers. The "donkey" behind Gus was once used to clamp and hold thin stock for hand-fretsawing.

Washington, D.C.," says Gus. "A lady came up to tell me about this footstool she had bought when her son was small. It had his name cut out in the top, like a puzzle. She wanted another one, but had lost track of the company. If I saw it, could I make one? Well, she ended up inviting me to dinner that night with her husband. I saw the stool, and I've been making them ever since."

Gus explains just why the item has remained so popular. "I make them out of 2"-thick yellow poplar. They're real sturdy, but unique because they're manipulative. The way I cut the letters out, the child has to put them in the right way, so even two-year-olds learn to spell their name. Then I paint all the letters in primary colors so they learn them, too. I've found that the puzzle stools are so popular that once a child in a family gets one, all the other kids eventually get one as well. They become a tradition. Why, one lady customer of mine has purchased 20 stools from me in the last decade or so."

Scrolling along for business and pleasure

Gus' woodworking started when his two children (now grown) were toddlers. Store-bought toys were costly for a family just starting out, so Gus made them in his basement workshop on a scrollsaw. Before long, he was making toys and selling them to his neighbors, but never on the scale he works today.

Scrollsaws take prominence in Gus' woodworking shop these days. He has three of them always at the ready. And they're all made by Hegner, a company he frequently demonstrates for. Next in importance is the commercial-type stroke sander that smooths the surface of his toys. But even as quickly as Gus has learned to cut out, sand, paint, and assemble his products, he still occasionally calls for help.

"There's a big cottage industry in the North Carolina mountains," he explains. "Businesses farm out work for people to do in their homes—everything from quilts to furniture. So I've developed that here in Raleigh. I may have as many as five people at peak times painting or assembling toys in their homes. After all, I only have two hands. Of course, I have all the outside work done to my quality level.

"I don't really work hard, I'm just having fun," adds Gus with a chuckle. "In fact, I sometimes think of myself as Gippetto, the toymaker in Walt Disney's *Pinnochio*, and wouldn't be surprised if one of my toys talks to me some day."

THEY SPREAD THE WOODWORKING

Once each year, a North Carolina junior high helps children get elbow deep in traditional crafts.

The drill press is a new experience for Tiffany Covington, Naopie Dora, Shannon Hawkins, and Terkingness Covington.

Pack hundreds of exuberant young teenagers into a vintage gymnasium and stuffy tents on a steamy spring day and you'd expect bedlam, right? Yet, when the Fine Arts Festival comes to North Carolina's Rockingham Junior High School early each April, there's nothing of the kind. The unique two-week program creates nothing but intense interest and high-level participation.

"This program really grew out of frustration about 23 years ago," explains Dr. John Langley, principal. "There were 1,100 children who had absolutely no cultural arts being taught in the classroom. So it began as a raising of awareness for both parents and students. We started from scratch, and over the years it has grown into two weeks of spring festival and a week of storytelling in the fall. The whole idea is to let these children see crafts—if we can't see beauty we're destined to be barbarians. But if we can see beauty, we won't sell people drugs, we won't take people's property, we won't take their lives.We believe that the arts are an integral part of living."

Carver Tom Wolf shows Jigar Patel how to make a detailing cut on a caricature.

During those special two weeks each spring, the arts do come to life in little Rockingham (population 10,000). The first week brings handcrafts. More than three dozen craftsmen and craftswomen from all over the southeast show up to provide the daily hands-on instruction, and—get this—they do it for free! The students select their participation: pottery, stained glass, woodworking, basketweaving, dollmaking, quilting, painting, blacksmithing, and more. Then, for four half-days (they spend either mornings or afternoons in regular classes), they work on their projects under the eyes of the crafters. With the turnover between classroom and crafts, everyone gets a hands-on experience. The second week is devoted to appreciation of the performing arts, from modern dance to Shakespeare.

Time-out for teaching

For 10 years, Gus Stefureac *(page 35)* has taught scrollsawing at Rockingham's spring festival. Like the other artisans, he could instead be working in his shop creating an inventory to sell. Instead, his enthusiasm for helping kids make something with their hands brings him back. Because of his contagious interest, the enthusiasm is returned.

Says Beth Cagle, 13, an 8th grader: "This is my second time working with Gus, because I collect carousels. I like painting them the best. And the way Gus teaches, he shows you how to do it, then he lets you do it."

A newcomer to Gus' class is Tiffany Covington, 14, a 9th grader. She's new to woodworking, too. "I want to make a carousel because I think they're pretty. I've never run a machine before,

GOSPEL ONE KID AT A TIME

but running the saw will be fun. The years before I carved a duck and did a clay sculpture."

Lyle Wheeler, a chairmaker from Millers Creek, North Carolina, has been coming to Rockingham for eight years. "It's the first thing I do every spring," he says. "I like to teach students of this age. You can grasp their attention."

During the week, Lyle will teach eager students how to make a "post-legged" footstool. "They'll be using mortise-and-tenon, greenwood construction," he explains. "We'll be quartering the red oak logs and rivving them, then shaping them on the shaving horse." (See photo *right.)*

A famed caricature artist among carvers, Tom Wolf of West Jefferson, North Carolina (shown *opposite page)*, has made the seasonal trip for 18 years. He recalls how the classes started: "It was a little craft show at first, and Dr. Langley assigned us students as go-fers. First thing I did was set 'em down and give 'em a knife so they'd be still, you know, so the idea came up to teach.

"In my carving classes, though, I don't mix boys and girls. With handling a sharp knife and all, they don't need other distractions. But I like it, and I'll keep coming back as long as my health and God allow."

Max Woody (shown *below*), a Marion, North Carolina woodturner specializing in rocking chairs, agrees with the event's purpose. "The children find out that they have talent. If you can get them interested in something like this, it could change the direction of their whole lives. I'm a year behind on orders, but I just love this. And Doc Langley has got a real concern that these children get a real learning experience."

Give them a reason, and they will come

How do you get 40 craftspeople to spend a week of their time teaching kids without pay? One answer: guarantees. Dr. Langley makes sure that no one will lose money by offering accommodations and paying travel expenses from funds raised by business donations and activities such as car washes. Then, all meals are taken care of, beginning with a free opening-night barbeque. And every evening there's a retail craft show open to the public. According to Dr. Langley, the crafters won't lose any money, and they might even make some.

Another answer lies in the exper-ience itself. Max Woody sums it up best: "It makes it easy to go to sleep at night if you help these children. This program is an investment in young people."

"I wanted to make something with my hands," explains Brian Reynolds as he cuts away at a stool leg under the eye of chairmaker Lyle Wheeler.

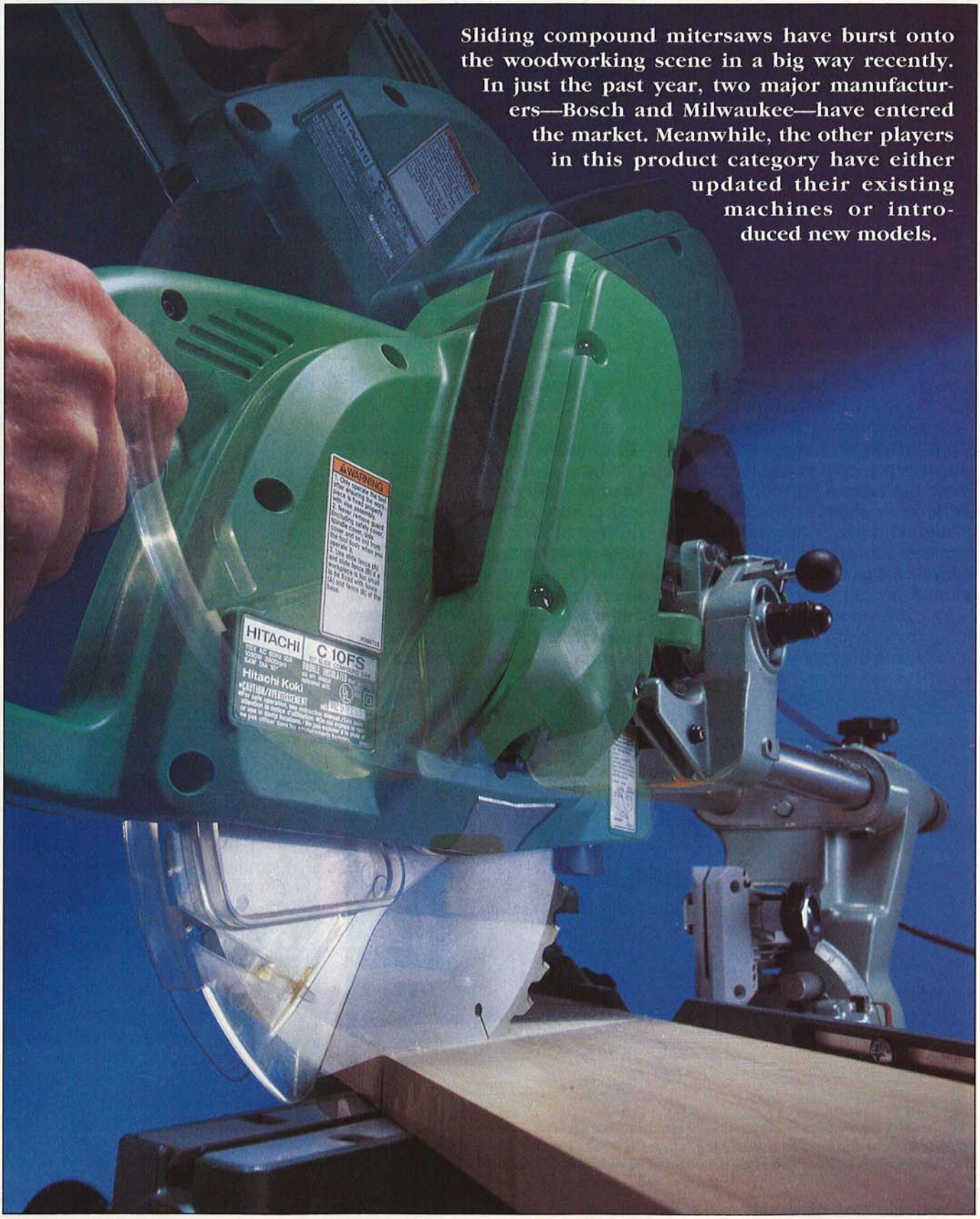
While Max Woody turns a chair leg, students Tim Criscoe, Brian Smith, and Chad Higby learn to weave rush seats on mountain-style stools.

Why not get something going where you live?

For more information on Rockingham Junior High's crafts program and how they do it, write with a SASE to: Dr. John W. Langley, Principal, Rockingham J.H.S., P.O. Box 1658, Rockingham, NC 28379.

Written by Peter J. Stephano
Photographs: Steve Uzzell

SLIDING COMPOUND



Sliding compound mitersaws have burst onto the woodworking scene in a big way recently. In just the past year, two major manufacturers—Bosch and Milwaukee—have entered the market. Meanwhile, the other players in this product category have either updated their existing machines or introduced new models.

MITERSAWS Super handy no matter how you cut it

What separates "sliders" from other mitersaws

Today's sliding compound mitersaws descended from the basic mitersaw, which first appeared on the market in the late 60s. Like their ancestors, today's sliding saws have a motorized head with a blade, handle, and guard that arcs down into a workpiece to make a cut. But that's where the family resemblance ends. After plunging the blade into the workpiece, you can complete cuts on workpieces up to 12" wide by holding the head down and pushing it away from you. To accomplish this nifty trick, the head slides forward and back on rod(s).

The rods are connected to the saw's base via a "knuckle" assembly that enables the head to tilt up to 45°. This bevel-cutting talent, combined with the ability of the head, rod(s), and knuckle to rotate left or right for miter cuts, enables you to make quick, easy, and accurate compound cuts.

Cutting capacity: one of your first considerations

All of the tested machines will crosscut a 2×12 at a 0° miter and a 2×8 at a 45° miter. However, if you need to crosscut 4× stock, or large moldings stood on edge, you'll need to narrow your search to the machines with 10" or 12" blades. The chart at the end of this article lists cutting capacities.

Let's take a look at the sliding mechanisms

As you can see in the chart, the machines in our test have six different slide types. They differed in the number and configuration of the rods (sometimes referred to as tubes or rails). In our tests each sliding mechanism worked smoothly and supported the head rigidly throughout its travel.

Although we've heard from woodworkers who perceive that the single-tube Makitas would have more flex, we didn't find this to be the case. What little flex we found in any of the machines originated in the aluminum castings that support the rods or head, or in the fit of the sliding-mechanism components. To their credit, the Makita models had the smoothest slide of the tested models. And, the multiple-rod models require you to align the rods with each other—something that's not necessary with the Makitas.

We slightly favor the machines with top-mounted rods because the bottom-mounted rods accumulate more sawdust. Shop debris should not cause damage to the bearings that slide along the rods if you maintain the felt or rubber "wipers" that seal the bearings.

How easily you can change blades counts, too

All of the tested machines have effective blade guards for your safety, and spindle locks that hold the blade stationary while you loosen its blade bolt. But, we found that some spindle locks were easier to activate, and some guards interfered less with blade changing. Also affecting blade-changing ease (which is rated in the chart) are: available room to maneuver the blade during removal so as not to chip its teeth, the need for only one wrench, and on-tool wrench storage.

Portability: vital for on-the-go woodworkers

If you intend to frequently move your sliding compound mitersaw, pay close attention to the "portability" and "weight" columns of the chart. We found that we could wrestle most of the tested models from place to place without too much difficulty, but the Makita LS1211 posed a bit of a challenge because of its weight (51 pounds) and bulkiness. The Delta Sawbuck weighs in at 78 pounds, but has wheels on its foldaway legs to ease transportation. Still, getting it up stairs or through doorways is a job for two people. The Delta Sidekick weighs 55 pounds, but its foldaway legs and work extensions proved so handy for job-site work that we can overlook its weight.

Two of the easiest saws to move were the Hitachis because of their top-mounted handles for one-handed, well-balanced carrying.

Continued

How these tools compare to radial-arm saws

In recent years, many woodworkers have chosen sliding compound mitersaws over a radial-arm saw. Why? For starters, a good sliding compound mitersaw costs less than a good radial-arm saw. The machines in this test, all of which we consider of good overall quality, sell for as little as $370. A good radial-arm saw for home use costs at least $500.

We also prefer sliding compound mitersaws for their portability and ease of adjustments. We've found that once adjusted, sliders maintain their accuracy better than radial-arm saws.

In terms of safety, we again give the nod to sliding mitersaws. With these saws, you *push* the blade through the workpiece. A radial-arm saw blade must be *pulled* through the stock, sometimes causing the blade to grab or "climb" toward you (The exception among the tested machines is the Delta Sawbuck. It has a blade that you pull toward you like a radial-arm saw.)

On the other hand, radial-arm saws will hold a dado set, and can make rip cuts—two traits not found in sliders. We can overlook these points because we prefer to rip and dado workpieces with a tablesaw or router.

SLIDING MITERSAWS

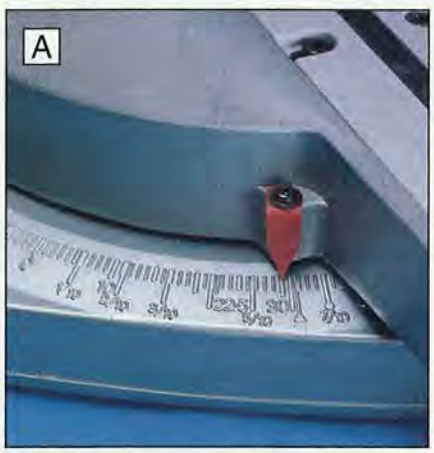
Points to consider about mitering mechanisms

For a mitering mechanism to work effectively, it must possess three qualities. It should have an accurate, easy-to-read miter scale, solid-feeling detent stops at popular miter settings, and a locking mechanism that's secure and easy to use. (A detent stop is a spot along the miter scale that the turntable automatically stops at as you rotate it.)

The tested machines had cast-in miter scales such as the one shown in *photo A*, or attached tape or sheet-metal scales, like the one in *photo B*. We found both types accurate, but the tape or sheet-metal scales had finer markings and were easier to read. We especially liked the miter scales on the Delta Sawbuck and Sidekick. We could easily make fine miter adjustments because these scales form much larger arcs than those on other models.

To help you quickly set common miter angles, all of the tested units have detent stops at 0°, 15°, 22.5°, and 45°. The Sears unit includes a stop at 30°, and the Hitachis and Makitas have stops at 31.6° and 35.3° for cutting crown moldings. We prefer the detents with a "heavy feel" that lock positively at the preset angles without any wiggle room. The Makita LS1011and Delta Sawbuck were tops in this regard.

After you adjust the machine to the correct miter setting, you should lock it firmly in place. All of the machines provide a means of doing this, but some were more convenient than others. Most of the tested machines have locking knobs at the front of the table as shown in *photo C*. These proved easy to use, as was the spring-loaded lever on the front of the Delta Sidekick. The Makita LS1011, Ryobi, and Tradesman models have a threaded knob located on the back of the fence like the one in *photo D*. These proved inconvenient and time consuming to operate.



Like other cast-in miter scales, this one on the Hitachi C10FS proves durable, but hard to read, and difficult to adjust in fine increments.

Attached sheet-metal or tape miter scales, such as the Delta Sidekick's here, are easy to read and help you make fine miter adjustments.

Miter-locking knobs like the one on the Sears Craftsman machine proved quick and easy to secure.

Miter-locking knobs located behind the fence were effective, but a bit of a hassle to reach and operate.

Bevel scales and locks: not a highlight of these tools

Chances are you won't be using the beveling mechanism nearly as much as the mitering mechanism. And it's a good thing, because nearly all of the bevel scales and locks proved hard to use. That's because most of them are located in the back of the saw. This means you can't conveniently see the scale, and you have to reach clear around to the back of the machine to operate the lock. However, there were a few notable exceptions.

The Delta Sawbuck has its bevel lock conveniently located right up front. Its bevel scale is also located up front. And, you can easily read the bevel scale on the Makita LS1211 because it's located on the front side of the bevel knuckle.

The bevel locks on the Hitachi saws, although located on the back of the machines, were the best of the lot. That's because the Hitachis have a locking lever with a left-hand thread (the other locking levers have right-hand threads). This means the lever unlocks in the same direction that the head tilts, making it easier to access and operate the lever at 0° or 45° bevels.

More points to consider

•Power
The motor amperage of the tested machines varied from 9.5 to 15 amps. All of the machines had enough power to complete any cut we tried, but the Delta Sidekick, Ryobi, Tradesman, and Sears saws slowed down in heavy cuts more noticeably than the other tested units. Keep this in mind if seconds count as you work to complete a project.

•Blade quality
Before buying any saw, seriously consider the quality of the blade that comes with the machine. Any saw will produce cuts only as good as the blade mounted in it. If the machine comes with a blade that rates "fair" or "poor" in the chart, count on replacing it with a high-quality blade costing at least $45. Only the blades that we rated "excellent" are suitable for high-quality woodworking.

•Handles and switches
In the chart we give each of the tested saws a grade in this area. While all of the handles and switches worked, we found that some were more comfortable, particularly during long work sessions. The grades reflect the effort required to grip the handle, swing the head down and keep it there during a cut, and the location of the on/off switches and safety interlocks (the buttons you need to depress before operating the on/off switch).

Most of the tested saws have safety interlocks located on the left side of the handle. This proves handy for right-handed operators, but somewhat awkward for left-ies. Hitachi solves this by placing the safety interlock on the top center of the handle. We found this convenient when operating the saw with a left or right hand.

•Noise
All of these machines have noisy universal motors, so while none of them were quiet in operation, some were more offensive to our ears than others. The Hitachi C10FS was the quietest machine, thanks to its belt drive and relatively slow blade speed—3,800 rpm. All of the other machines were over 4,000 rpm.

•Work clamps
All of the machines, except the Delta Sawbuck, can be equipped with clamps that hold the workpiece tight onto the saw's table. We found these essential for making precise cuts. (Even with firm hand pressure, a workpiece will "creep" slightly during a cut.) All of the tested work clamps were of the standard screw type, except for the ones on the Bosch B3915 and the Delta Sidekick. These machines have a cam-type lever that works quick and secures tightly. (The Delta version is shown in the photo *below*.)

The cam-style work clamp on the Delta Sidekick proved quick to adjust.

•Depth-of-cut adjustment
Although none of these saws, except for the Delta Sawbuck, take dado sets, you can use them to make a series of side-by-side cuts at preset depths. The Makita LS1211 was tops in this regard because it has two depth stops that allow you to quickly switch between full-depth and partial-depth cuts.

•Fence height
Although we've heard much said about the importance of a high fence on mitersaws, we found this to be somewhat of a none-issue. All of the fences were high enough for most tasks, and the compound feature of these saws makes it possible to lay wide crown moldings flat when cutting them. If you prefer to lean the crown molding against the fence, all of the saws except for the Delta Sidekick provide some means of attaching higher auxiliary wooden faces to the fences. Such auxiliary faces can also be used to narrow the gap between the two fence sides.

•Dust collection
None of the tested machines does a good job of collecting dust. At best, only about 50 percent of the dust winds up in the dust bag, and lots of fine dust becomes airborne. You can help this situation by hooking up a shop-vacuum in place of the dust bag. This way you will capture about 75 percent of the dust, and greatly reduce the amount of airborne dust.

•Electronic features make a difference in performance
First the good news. All of the tested machines have electric brakes that quickly stop the blade after you let go of the on/off switch. But, only the Hitachi C10FS has soft start and electronic speed control. In our tests we developed an appreciation for both of these features.

The soft start, belt-driven C10FS takes just a second to come up to full speed. This eliminates the upward "kick" that the other machines display as their blades come up to full speed almost instantaneously.

The electronic speed control consists of a circuit that senses motor load and compensates for heavy cuts by supplying more power to the motor. This helps the blade maintain constant speed in thick or dense woods.

Continued

SLIDING MITERSAWS

Our recommendations

Unlike most of our tool tests, we had a hard time picking a "winner" from among the tested machines. All of them work well, and which model you select depends entirely upon your budget and requirements for cutting capacity and versatility.

Among the machines priced around $400, the Sears Craftsman or Tradesman models performed

MANUFACTURER	MODEL	BLADE SIZE (INCHES)	CAPACITY: MAXIMUM THICKNESS (0°/45° - INCHES)	CAPACITY: MAXIMUM WIDTH (0°/45° - INCHES)
BOSCH	B3915	10	3 1/2 2 1/4	12 8 5/8
DELTA	SAWBUCK 33-055	8	2 3/4 1 3/4	16 12
	SIDEKICK 36-250	10	3 5/8 2	11 1/2 8
FREUD	TR215	10	2 3/4 2	11 3/4 8 1/4
HITACHI	C8FB2	8 1/2	2 9/16 1 25/32	12 8 21/32
HITACHI TOP TOOL	C10FS	10	3 35/64 2 3/8	11 59/64 8 21/32
MAKITA	LS1011	10	3 9/16 1 9/16	12 8 7/16
	LS1211	12	4 3/4 2 9/16	12 3/16 8 5/8
MILWAUKEE	6497	10	3 29/32 2 3/8	12 3/8 8 3/4
RYOBI	TSS200	8 1/2	2 5/8 1 3/4	12 8 1/2
SEARS CRAFTSMAN TOP VALUE	23488	8 1/4	2 1/2 3 1/4	12 8 5/8
TRADESMAN TOP VALUE	8335	8 1/2	2 5/8 1 3/4	12 8 1/2

NOTES:

1. (*) 60° right only
2. (*) Bevels left and right. Other saws bevel left only.
3. (DBMR) Double bottom-mounted rods
   (DTMR) Double top-mounted rods
   (DVAR) Double vertical-aligned rods
   (SBMR) Single bottom-mounted rod
   (STMR) Single top-mounted rod
   (TTMR) Triple top-mounted rods
4. (A) Aluminum (P) Plastic

best. The Craftsman model was a little more convenient to use, and costs $50 more.

If you care to spend around $500, both the Delta Sidekick and Makita LS1011 have 10" blades that give you cutting capacity that the lower-priced machines can't match. The Sidekick costs a little less, and it's built-in stand and work extension will prove handy if you intend to move it from place to place. The Makita comes with a much better blade, and its bevel-locking mechanism requires less force for solid locking.

For the ultimate in cutting capacity and versatility, buy either the Hitachi C10FS or Makita LS1211. Both saws bevel left and right, but the Hitachi offers soft-start, and maintains more-consistent speed under load. If the 10" blade on the Hitachi has all the cutting capacity you'll ever need, we recommend this saw. But, if you need the extra cutting depth, or 60°-miter-cutting ability of the Makita, the extra $50 for this machine will be money well spent.

Written by Bill Krier
Photographs: John Hetherington; William Hopkins

TAKE A CLOSE LOOK AT TODAY'S SLIDING COMPOUND MITERSAWS

STOPS					BASE MATERIAL (4)		PERFORMANCE (5)										ACCESS. (9)						
MITER (1) (LEFT AND RIGHT) (DEGREES)	BEVEL (DEGREES) (2)	MITER RANGE LEFT/RIGHT (DEGREES)	SLIDE TYPE (3)	TURNTABLE	FRAME	MOTOR AMPS	PORTABILITY	NOISE (6)	BLADE QUALITY	EASE OF CHANGING BLADE	BLADE GUARD EFFECTIVENESS	HANDLE AND SWITCHES	DUST-COLLECTION EFFECTIVENESS	SCALES (7)	MITER LOCK (8)	BEVEL LOCK (8)	STANDARD	OPTIONAL	WARRANTY (YEARS) (10)	COUNTRY OF ASSEMBLY (11)	WEIGHT (POUNDS)	SELLING PRICE (12)	COMMENTS
0, 15, 22.5, 31.6, 45, 60, *	0, 33.9, 45	52/62	DTMR	A	A	13	F	G	F	G	E	E	F	E	E	G	DB, WC	EW, LS	1	T	47	$600	A solid machine, and the only one tested with miter detent overide. We liked its effective cam-action clamp, but would like to see it shipped with a higher quality blade.
0, 22.5, 31.62, 45	0, 45	47/47	TTMR	P	P	15	F	F	P	F	F	G	P	G	E	E	EW, LW	--	2	U	78	630	Although capable of making crosscuts up to 16" wide, the rails are joined to the table front and back, making it tiresome to cut long material. The only tested machine that accepts a dado set.
0, 15, 31.6, 45	0, 45	46/57	DBMR	A	A	13	G	G	F	E	G	F	F	G	E	G	DB, EW, LS, WC	--	2	T	55	495	Comes with built-in legs and work extensions. The cam-action work clamp is fast and effective. Has an easy-to-use miter lock, but we didn't like the angle of the handle or the bevel-lock location.
0, 15, 22.5 30, 45	0, 45	45/45	DTMR	A	A	9.7	NOT AVAILABLE FOR TESTING										DB	DP, EW, WC	1	S	37	370	NOT AVAILABLE FOR TESTING
0, 15, 22.5, 31.6, 35.3, 45	0, 30, 34, 45	45/57	DTMR	A	A	9.5	E	F	E	G	E	E	F	G	E	E	AF, DB, WC	EW	1	U	39	500	For several years this saw has been the model that other manufacturers emulate when designing new machines. It's still a solid, all-around performer.
0, 15, 22.5, 31.6, 35.3, 45	45, 0, 45, *	45/57	DTMR	A	A	10	E	E	E	E	E	E	F	G	E	E	AF, DB, WC	EW	1	U	44	750	Our favorite saw. The ability to bevel left and right comes in handy. Its quiet operation, consistent blade speed under load, and soft start make it a pleasure to use.
0, 15, 22.5, 31.6, 35.3, 45	0, 45	46/58	SBMR	A	A	12	G	G	E	E	E	G	F	F	F	F	DB, WC	EW	1	U	35	530	The easy-to-remove guard works well and makes blade changing a snap. You'll appreciate its smooth slide and plunge action.
0, 15, 22.5, 31.6, 35.3, 45	45, 0, 45, *	60/60	STMR	A	A	15	F	F	E	E	F	F	F	F	E	G	DB, WC	EW	1	U	51	800	This saw has it all, does it all, and has a price to match. It has significantly more capacity than any other tested machine, and its 96-tooth carbide-tipped blade makes satin-smooth cuts.
0, 15, 22.5, 30, 45	0, 45	51/59	DVAR	A	A	15	NOT AVAILABLE FOR TESTING										DB, EW, WC	--	L	U	55	N/A	NOT AVAILABLE FOR TESTING
0, 15, 22.5, 30, 45, 60, *	0, 45	45/60	TTMR	A	A	10	G	F	F	G	G	E	F	E	F	G	DB, EW, WC	--	2	T	44	400	A three-rod slide mechanism proved solid and free of play. A good saw in most regards. The miter-locking mechanism, which is hard to reach and difficult to use, could stand improvement.
0, 15, 22.5, 30, 45	0, 45	47/52	DTMR	A	A	10	G	G	F	E	E	G	F	G	E	G	CM, EW, WC	DB	1	T	42	420	This solid performer was recently improved when Sears switched from cast iron to aluminum for its base. Its 8¼" blade size limits your brand choices when buying a replacement blade.
0, 15, 22.5, 30, 45, 60, *	0, 45	45/60	TTMR	A	A	10	G	F	G	G	G	E	F	E	F	G	DB, EW, WC	--	1/5*	T	44	370	Essentially the same machine as the Ryobi TSS200, but has a slightly better blade. This machine also carries the Master Mechanic label in some True Value stores.

5. E Excellent, G Good, F Fair, P Poor

6. E 90 Decibels or less; G 96 Decibels or less; F 97 Decibels or less. Rating was also weighted by quality of sound.

7. Rating based on location, visibility, reading ease, and number of pre-marked common angles or settings.

8. Rating based on location and size of knob or handle, and the amount of effort required to lock it securely.

9. (AF) Auxiliary sliding fences; (CM) Crown-molding kit; (DB) Dust-collection bag; (DP) Dual-port dust-collection hose; (EW) Extension wings; (LA) Light attachment; (LS Leg set; (LW) Leg-and-wheel set; (WC) Workpiece clamp

10. (L) Lifetime; (*) 1 year for labor, 5 years for parts

11. (J) Japan; (T) Taiwan; (S) Spain; (U) United States

12. Mail-order prices at time of article's production.

Manufacturer's phone numbers:
Bosch: 312/794-7486
Delta: 800/438-2486
Freud: 800/472-7307
Hitachi: 800/362-7297
Makita: 714/522-8088
Milwaukee: 414/781-3600
Ryobi: 800/525-2579
Sears: 800/377-7414
Tradesman: 800/243-5114

Graceful and Easy MIRROR / SHELF

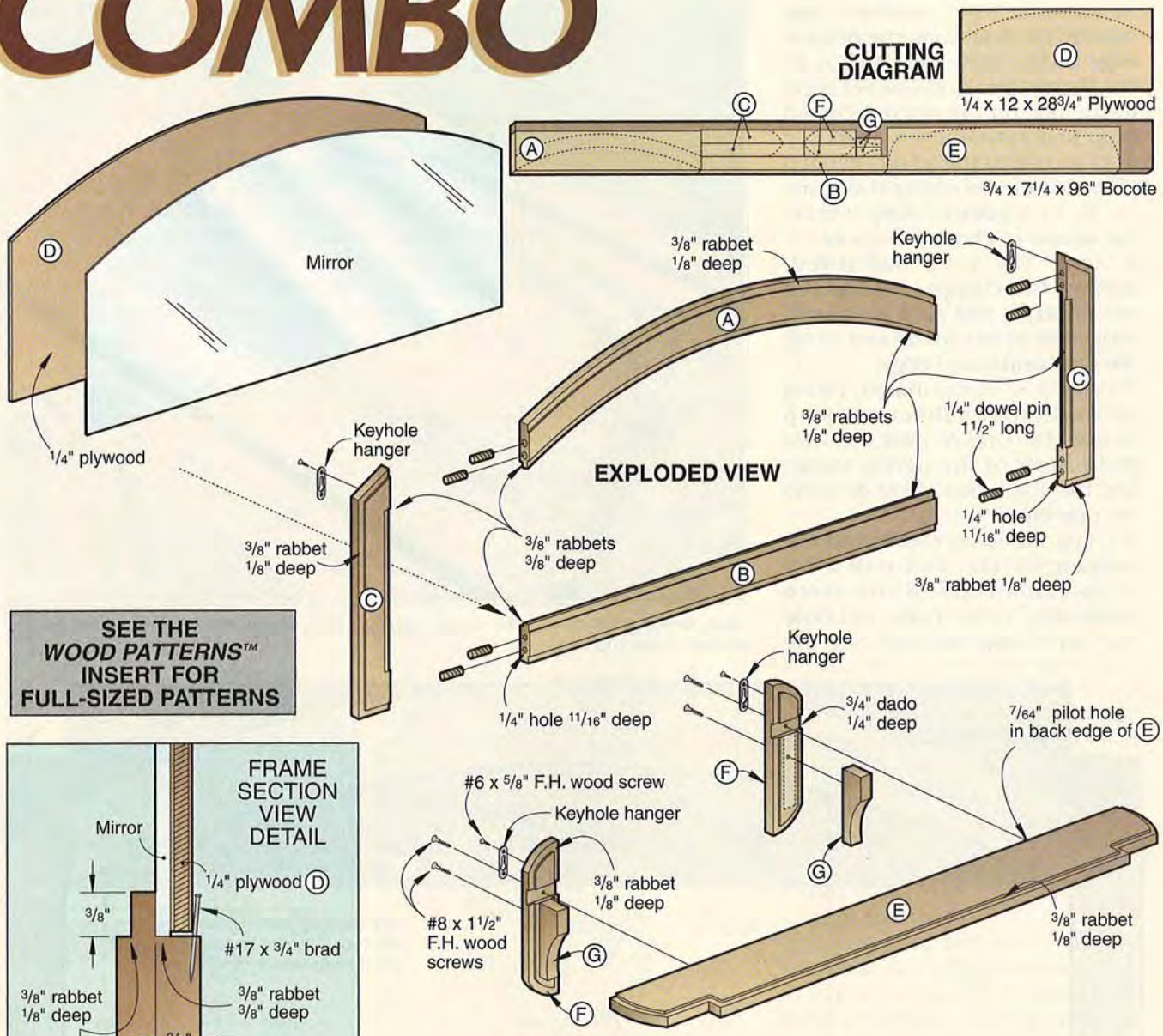
Looking for a way to dress up a drab wall or grace an entry? Look no further. This stylish twosome does that elegantly. Simple construction, curved lines, and decorative rabbets team for a fresh look that's suitable for both traditional and contemporary interiors.

Start with the arched-top mirror frame

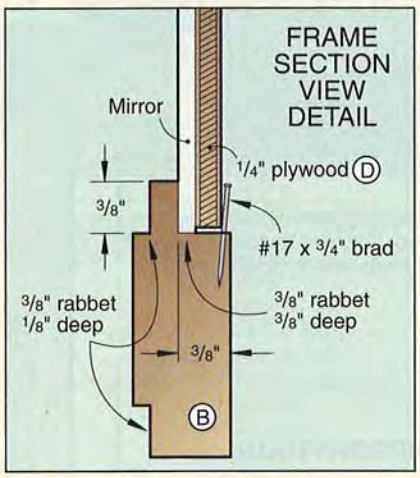
1 Cut the mirror-frame arched top blank (A), bottom rail (B), and stile blanks (C) to the sizes listed in the Bill of Materials. We used bocote (also called cordia), a nonendangered tropical wood from Central America. See the Buying Guide for our source, or use a wood to match or complement the woodwork found in your home.

2 Using the Mirror Frame drawing for reference, clamp (no glue) the pieces together in the configuration shown. Then, use a square to mark the dowel-hole centerlines at each joint where dimensioned. Next, mark the

COMBO



SEE THE *WOOD PATTERNS™* INSERT FOR FULL-SIZED PATTERNS



arcs on the clamped-together frame where shown on the drawing. (To make the lines easier to see, we placed masking tape on the wood and marked on it.)

3 Remove the clamps, and use a doweling jig to drill ¼" dowel holes 11/16" deep where marked on pieces A, B, and C.

Continued

Bill of Materials					
Part	Finished Size			Matl.	Qty.
	T	W	L		
MIRROR FRAME					
A arched top blank	¾"	5⅞"	28"	B	1
B bottom rail	¾"	2"	28"	B	1
C stile blanks	¾"	2"	13½"	B	2
D backing	¼"	11⅞"	28⅝"	PL	1
SHELF ASSEMBLY					
E shelf blank	¾"	5"	35"	B	1
F uprights	¾"	2"	7¾"	B	2
G supports	¾"	1⅜"	3¾"	B	2

Materials Key: B–bocote, PL-plywood.

Supplies: 8–¼" dowel pins 1½" long, #6x⅝ flathead wood screws, #8x1½" flathead wood screws, single-strength mirror (cut to fit), #17x¾" brads, clear finish.

Buying Guide

Hardwood kit. All the individual pieces shown on the Cutting Diagram cut slightly oversized in length and width from the thicknesses listed in the Bill of Materials. Available in bocote, quilted maple, and domestic species. Kit no. W872, $49.95 ppd. Heritage Building Specialties, 205 North Cascade, Fergus Falls, MN 56537. Or call 800/524-4184 to order.

Keyhole hangers. Part no. 38-891, $7 for 12 pair (minimum order), Constantines, 2050 Eastchester Road, Bronx, NY 10461, or call 800/223-8087.

MIRROR/SHELF COMBO

4 Using the previously marked bottom arc line, bandsaw just outside the line along the *bottom edge* of the arch top (A). *Don't cut the top line to shape yet.* Sand to the line on the bottom curved edge to remove the saw marks.

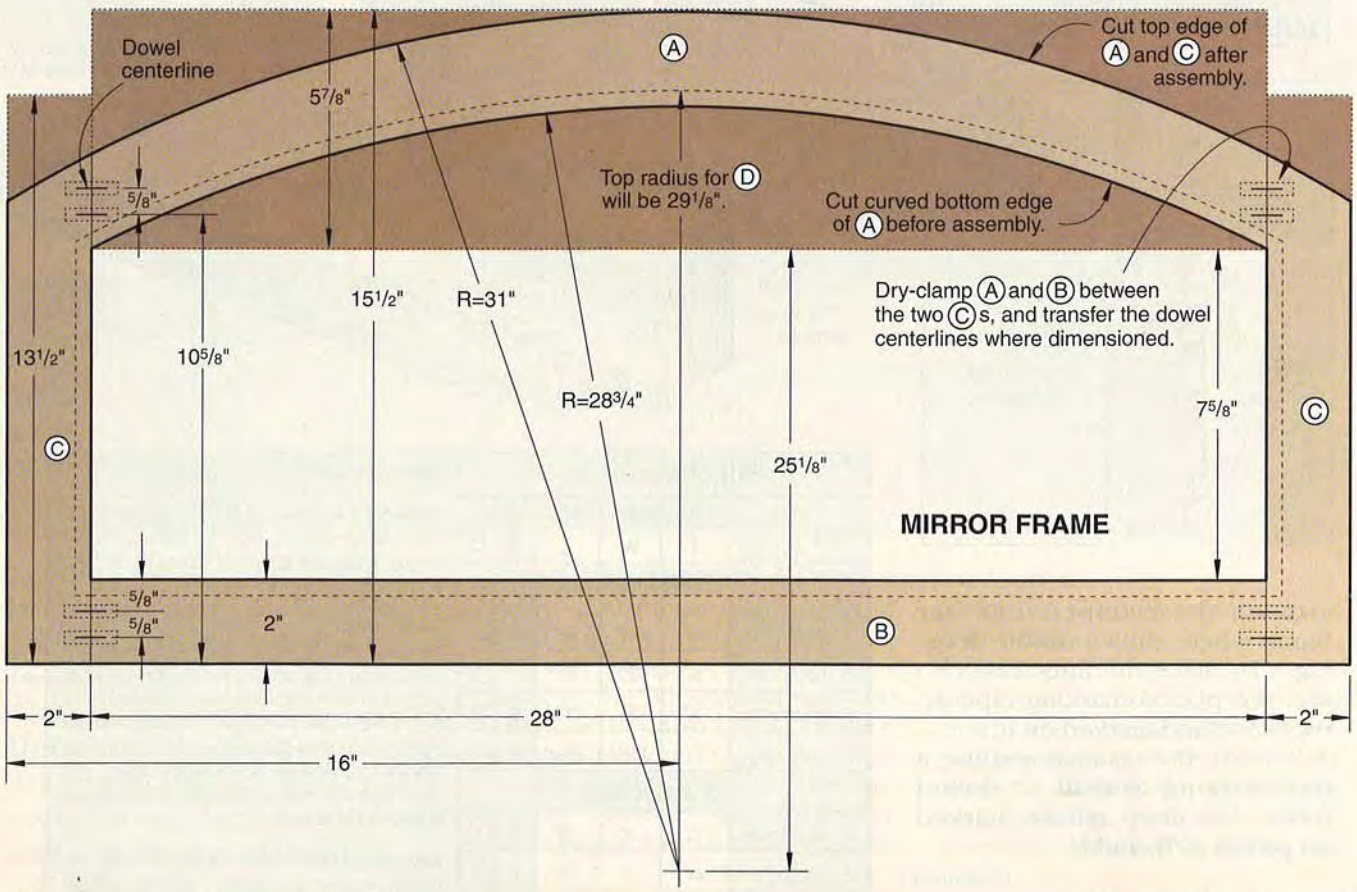
5 As shown in the photo at *right*, glue, dowel, and clamp the frame (A, B, C) together, using a framing square to check for square.

6 After the glue has dried, remove the clamps, cut the top arc to shape, and sand the frame, especially at the joints and along the top bandsawed edge.

7 Using a ⅜" rabbeting bit, rout a ⅜" decorative rabbet ⅛" deep along the *inside and outside front edges* of the mirror frame. See the Exploded View drawing for reference.

8 Using the same router and bit, deepen the cut, and rout a ⅜"-deep rabbet along the *back inside edge* of the frame to house the mirror and backing. See the

Glue, dowel, and clamp the frame pieces. Later, remove the clamps and cut the arched frame top to shape.



Frame Section View detail for reference. Next, chisel the bottom rabbeted corners square.

9 Measure the opening, and cut the arch-topped mirror backing (D) to shape from ¼" plywood or hardboard. As dimensioned on the Mirror Frame drawing, the arc across the top of the backing is a 29⅛" radius. Now, using the mirror backing (D) as a template, take it to a glass shop, and have them cut a piece of mirror ⅛" smaller in width and length than the template.

***Note:** If the arc on your backing differs from the opening—find out by reversing the backing in the rabbeted opening—sand the top of the backing until it fits both ways in the opening.*

The shelf and supports come next

1 Cut the shelf blank (E), shelf-support uprights (F), and shelf supports (G) to the sizes listed in the Bill of Materials.

2 Using the full-sized half pattern for reference, lay out the outline on the shelf blank (E), and bandsaw it to shape.

3 Transfer the full-sized patterns, and bandsaw and sand the uprights and shelf-support pieces to shape.

4 Drill a pair of countersunk mounting holes through the back of each upright (F) where shown on the full-sized pattern.

5 Cut a ¾" dado ¼" deep across each upright where shown.

6 Rout a ⅜" rabbet ⅛" deep along the top edge of the shelf (E) and the front edge of the uprights (F). See the Exploded View drawing for reference.

7 Form the mortises for the keyhole hangers on the back side of each mirror-frame stile (C) and each shelf upright (F) as described in the Forming the Mortises drawing *at left*.

8 Finish-sand the shelf, uprights, and supports (E–G). It's easier to sand the pieces now than after they've been assembled.

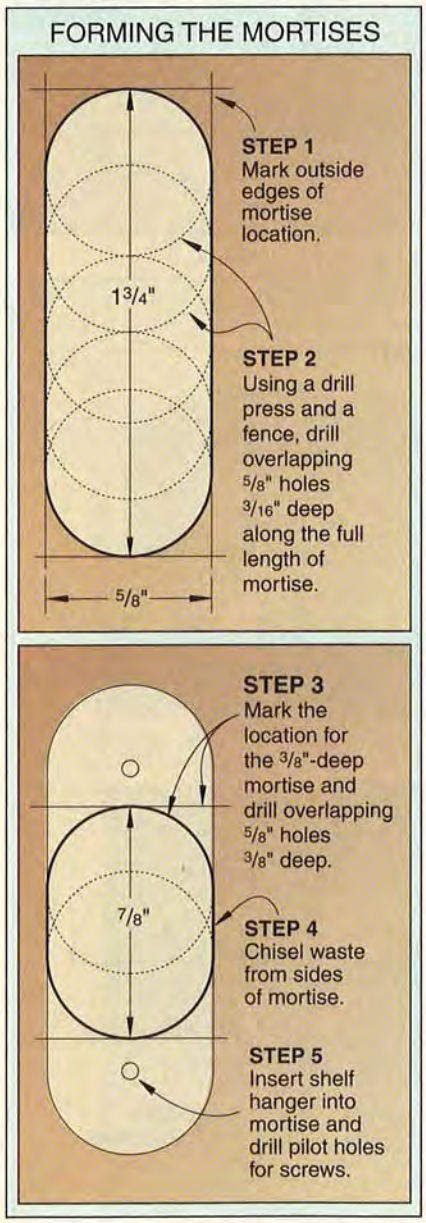
9 Glue and screw the shelf supports to the uprights so the top end of each G is flush with the bottom edge of the dado in each F. Wipe off excess glue with a damp cloth. Then, with the keyhole hangers in place, glue and screw the shelf to the uprights.

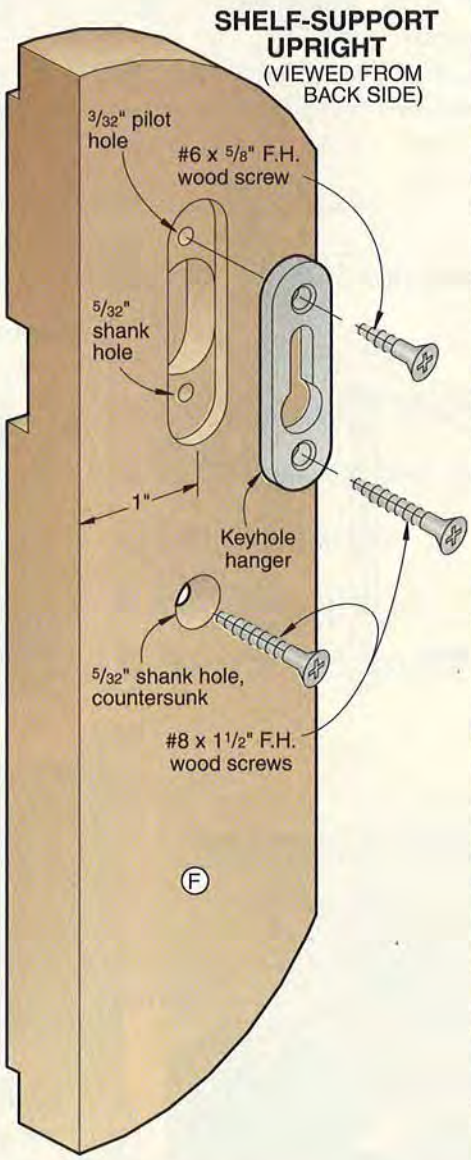
Final clean-up and assembly

1 Finish-sand the mirror frame and shelf assembly as needed.

2 Apply the finish (we used Deft aerosol lacquer, sanding between coats with 320-grit sandpaper).

3 Install the mirror with #17×¾" brads where shown in the Frame Section View detail accompanying the Exploded View drawing. (To prevent splitting the wood, we snipped the head off one of the brads, chucked it into our portable drill, and used the brad as a bit to drill angled pilot holes for the brads.)


FORMING THE MORTISES
STEP 1
Mark outside edges of mortise location.
1 3/4"
STEP 2
Using a drill press and a fence, drill overlapping 5/8" holes 3/16" deep along the full length of mortise.
5/8"
STEP 3
Mark the location for the 3/8"-deep mortise and drill overlapping 5/8" holes 3/8" deep.
7/8"
STEP 4
Chisel waste from sides of mortise.
STEP 5
Insert shelf hanger into mortise and drill pilot holes for screws.

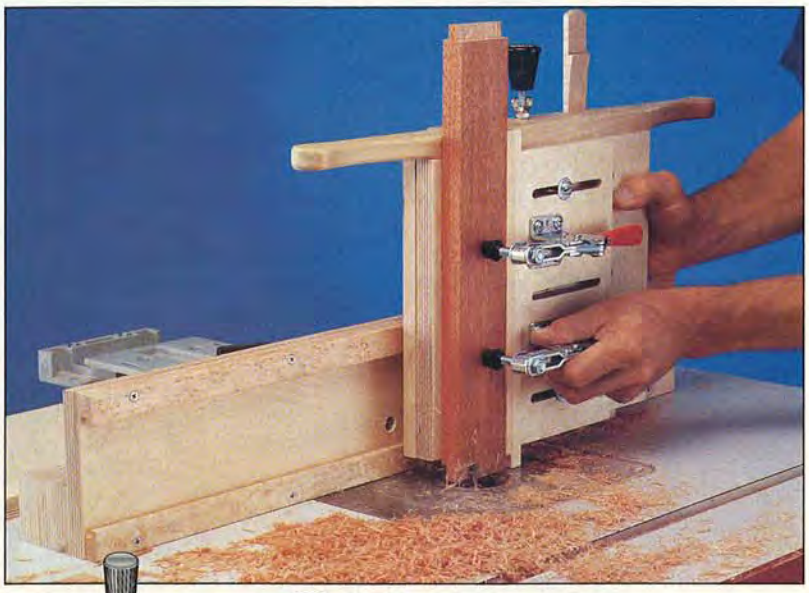


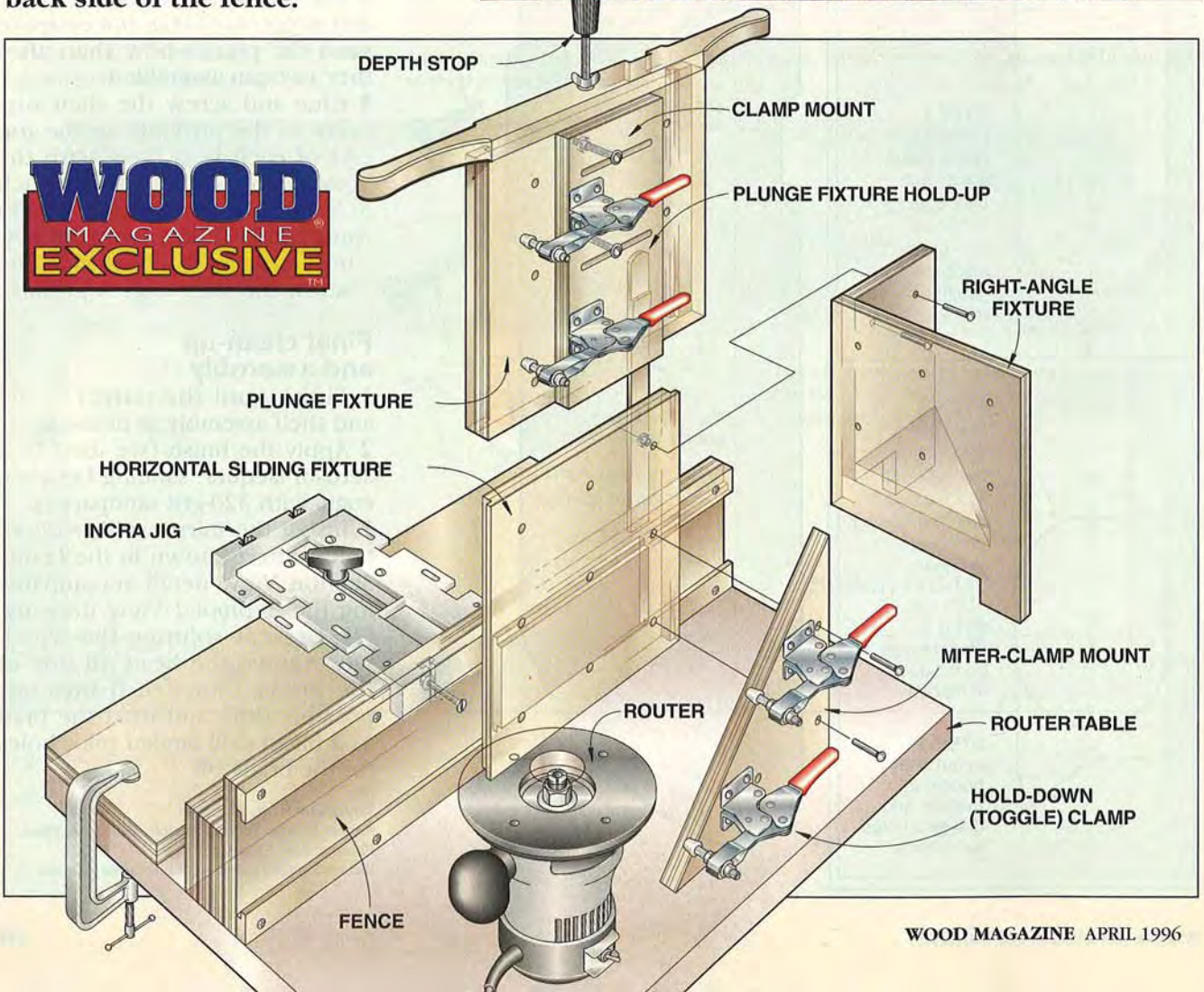
Written by Marlen Kemmet
Project Design: Todd Anderson, Shakopee, Minn.
Photographs: King Au
Illustrations: Roxanne LeMoine; Lorna Johnson

ROUTER-TABLE MULTI-JOINT JIG

Tough joinery just got a whole lot easier

Imagine machining stub and mitered tenons, mortises, and box joints easily and accurately every time. With this hardworking jig and your table-mounted router, now you can. The fence guides the whole operation while the plunge and horizontal sliding fixtures move the workpiece up and down and across the router bit. See the following article for numerous ways to put this handy jig to work in your shop. For even greater ease and accuracy in positioning the workpiece, consider adding an Incra Jig to the back side of the fence.





The fence plays an all-important supporting role

1 Cut the fence upright (A) to the size listed in the Bill of Materials from ¾" plywood. (See the Buying Guide for our source of plywood and hardware kits.)

2 Glue three pieces of ¾×2¼×29" plywood face-to-face with the edges and ends flush. Later, trim the block to 2" wide by 28" long to form the fence support (B).

3 To form the guides (C, I), cut three pieces of solid stock to ½×1×28". Cut or rout a ¼" rabbet ¼" deep along one edge of each strip. You'll use two of the guides (C) for the fence now; set the third piece aside for use later.

4 Keeping the top and bottom edges of the upright (A) flush with the outside edges of the guides (C) where shown on the Fence drawing, clamp the guides to the upright. Now, drill countersunk mounting holes through each C and into A, and screw the guides to the upright.

5 With the bottom edges flush, glue and clamp the support (B) to the back side of the upright (A).

6 If you plan on attaching the router jig to an Incra Jig (which we recommend), drill a pair of countersunk mounting holes through the upright (A) and support (B) where shown on the Fence drawing. Using a hacksaw, cut two ¼×3½" flathead machine screws to 3⅜" long. Later, you'll use these to secure the router jig to the Incra Jig.

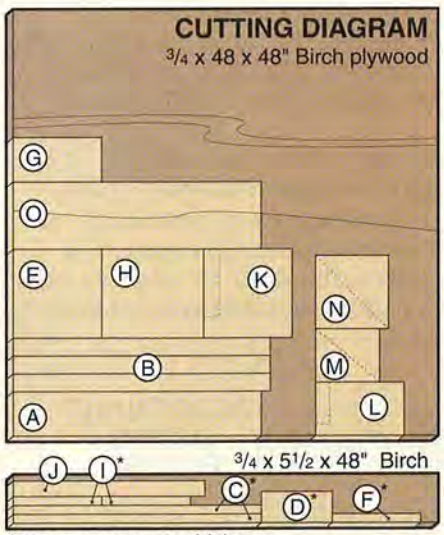
Add the horizontal sliding fixture

1 Cut the slide (D) to size from ½" solid stock. The width of the slide should be just a hair under the distance between the shoulders of the rabbets cut in the guides (C) attached to the fence upright (A).

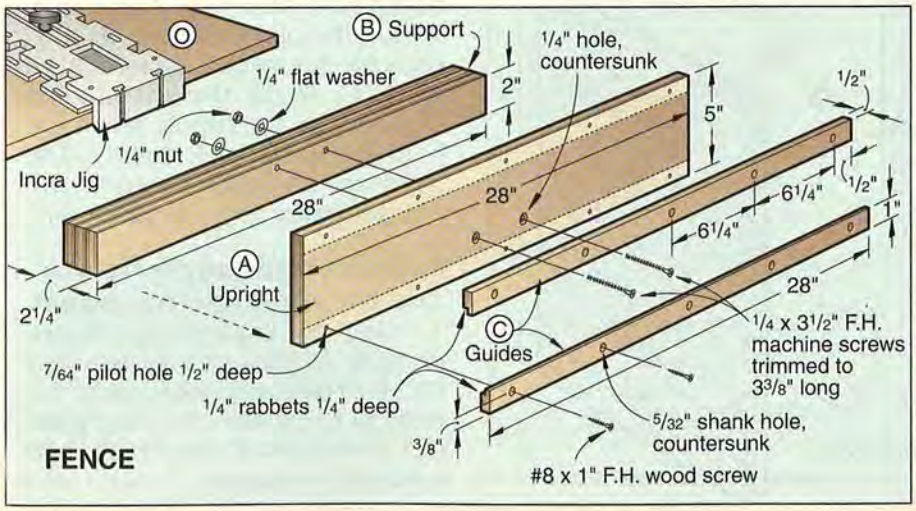
2 Cut or rout a ¼" rabbet ¼" deep along the edges of the slide (D). Check the fit of the slide between the guides (C). The slide must move back and forth easily without slop for precision machining later. If there is too much play, cut and rabbet another slide.

3 Mark and drill four countersunk mounting holes through the back side of the slide (D). See the Horizontal Sliding Fixture drawing for locations.

Continued



*Plane or resaw to thickness listed in Bill of Materials.



Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
FENCE					
A upright	¾"	5"	28"	BP	1
B* support	2¼"	2"	28"	LP	1
C guides	½"	1"	28"	B	2
HORIZONTAL SLIDING JIG					
D slide	½"	3½"	8"	B	1
E clamping plate	¾"	10"	10"	BP	1
F hold-up	⅜"	1"	10"	B	1
PLUNGE FIXTURE					
G clamp mount	¾"	5"	10"	BP	1
H clamping plate	¾"	10"	11½"	BP	1
I* guides	½"	1"	10"	B	2
J handle	¾"	1¾"	21⅝"	B	1
RIGHT-ANGLE FIXTURE					
K clamping plate	¾"	10"	10"	BP	1
L clamping-plate mount	¾"	6"	10"	BP	1
M brace	¾"	6"	7¼"	BP	1
MITER CLAMP MOUNT					
N mount	¾"	8¼"	8¼"	BP	1
INCRA JIG MOUNT					
O mount	¾"	8"	28"	BP	1

*Initially cut parts marked with an * oversized. Trim each to finished size according to the instructions.

Materials Key: BP–Baltic-birch plywood, B–birch, LP–laminated plywood.

Supplies: 20–#8×1" flathead wood screws, 8–#8×1¼" flathead wood screws, 2–#6×¾" roundhead wood screws with flat washers, 8–#12×¾" panhead sheet metal screws, 4–¼×1¾" panhead machine screws with flat washers, ¼" wing nut, ¼" nut, and ¼" flat washer, 25–¼-20 T-nuts, 2–¼×3½" flathead machine screws.

Buying Guide

Hardware kit. All the pieces listed in the supplies above plus two 2"-reach hold-down (toggle) clamps, and one 1¼" plastic knob with a mating piece of threaded rod 4" long, plus screws, washers, and nuts listed in the Supplies. WOOD KIT RJ1, $45 plus $4.75 shipping. ppd. Add $30 for two additional clamps and $39.95 for an Incra Jig. Schlabaugh and Sons Woodworking, 720 14th Street, Kalona, IA 52247 or call 800/346-9663.

Ready-to-assemble kit. All the pieces listed in the hardware kit *above*, plus all the Baltic-birch plywood pieces listed in the Bill of Materials cut to size and shape with predrilled holes. WOOD KIT RJ2, $175 plus shipping (call for shipping charges) Schlabaugh and Sons Woodworking, address and phone *above*.

Multi-joint jig

4 Cut the clamping plate (E) to size. Cut a ¼" rabbet along opposing edges. Each rabbet must leave a ¼" lip as noted on the drawing *below*. Since some ¾" plywood is not exactly ¾" thick, machine the first cut a bit shy of a ½" depth and measure the remaining lip. Increase the depth as necessary until a ¼" lip is left.

5 Mark the centerpoints for the nine 19/64" holes on the *back* side of the clamping plate (E) where shown on the *WOOD PATTERNS™* insert in the center of the magazine. *For securing the clamp mounts (G,L,N) to the clamping plates (E,H,K), keep the holes exactly 3½" apart.* To house the base of the ¼-20 T-nuts, use a Forstner bit to drill a ¾" counterbore ⅛" deep centered over each marked centerpoint on the *back side* of the plate. Drill a 19/64" hole centered inside each counterbore (the Forstner bit leaves a slight depression that you can center your bit over). Use a backing board to minimize chip-out.

6 Tap a ¼-20 T-nut into each ¾" counterbore on the back side of the clamping plate (E).

7 Clamp the slide (D) to the clamping plate (E) where dimensioned on the *WOOD PATTERNS* insert. Using the previously drilled holes in the slide as guides, drill pilot holes, and drive the screws to secure the slide to the clamping plate pieces together. Verify that the sliding assembly (D/E) slides freely when slid in place between the fence guides (C). If the fit is too tight, use pieces of paper *between* parts D and E to act as spacers. Again, you'll want a smooth sliding action with slop.

8 To make the hold-up (F), transfer the full-sized Front and Side View patterns from the *WOOD PATTERNS* insert to a piece of solid stock measuring ⅜×1×10". Drill the mounting holes, and then cut the hold-up to shape.

9 Screw the hold-up (F) to the clamping plate (E) where shown on the *WOOD PATTERNS* insert.

Here's how to make the plunge fixture

1 Cut the clamp mount (G) and clamping plate (H) to size.

2 Mark the three 5/16" slots and the locations for the two hold-down clamps on the clamp mount (G) where located on the *WOOD PATTERNS* insert. Position the hold-down clamps against the marked locations, and transfer the mounting hole locations from the hold-downs to the clamp mount.

3 Drill blade start holes, and scrollsaw the three slots to shape. Drill the mounting holes for the hold-downs.

4 Mark and drill the T-nut holes in the clamping plate (H), using the same process you used to drill the holes in the horizontal-sliding-fixture clamping plate (E). Tap the T-nuts in place.

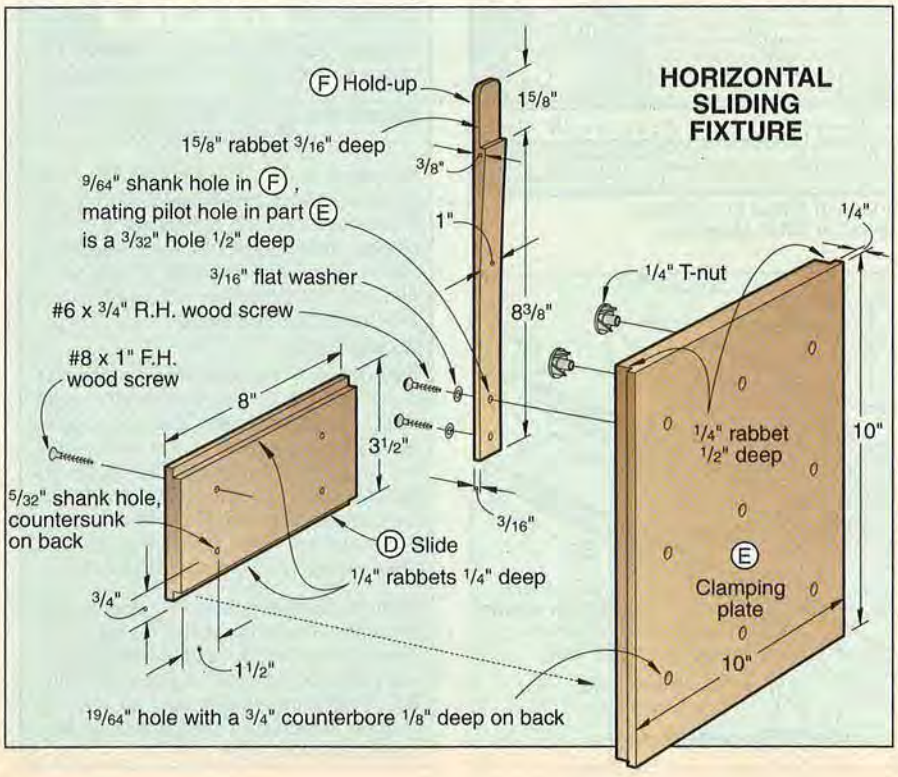
5 Crosscut the plunge-fixture guides (I) from the third piece of guide stock you cut earlier for parts C. Clamp (no glue) the guides to the back side of the clamping plate (H). Fit the plate/guide assembly (H, I) onto the horizontal sliding fixture. Adjust the location of the guides (I) if necessary for a good fit onto the rabbets on the ends of clamping plate (E). Drill mounting holes, and screw the guides (I) to the clamping plate (H).

6 Transfer the full-sized handle pattern (J) from the *WOOD PATTERNS* insert to ¾" solid stock. Cut the handle to shape. Drill the mounting holes where marked. Rout a 3/16" round-over along the top and bottom edges of the handle where marked on the pattern. Remove the paper pattern. Screw the handle to the top edge of the clamp plate (H).

7 Slide the plunge fixture (H, I, J) onto the horizontal sliding fixture (D, E, F). Verify that the hold-up (F) slides by the handle when the hold-up is held back slightly. The hold-up should support the plunge fixture above the tabletop.

Add the right-angle fixture and the miter-clamp mount

1 Using the Right-Angle Fixture drawing on the *opposite page* and the *WOOD PATTERNS* insert for reference, cut the clamping plate (K), clamp-plate mount (L), and brace (M) to shape.



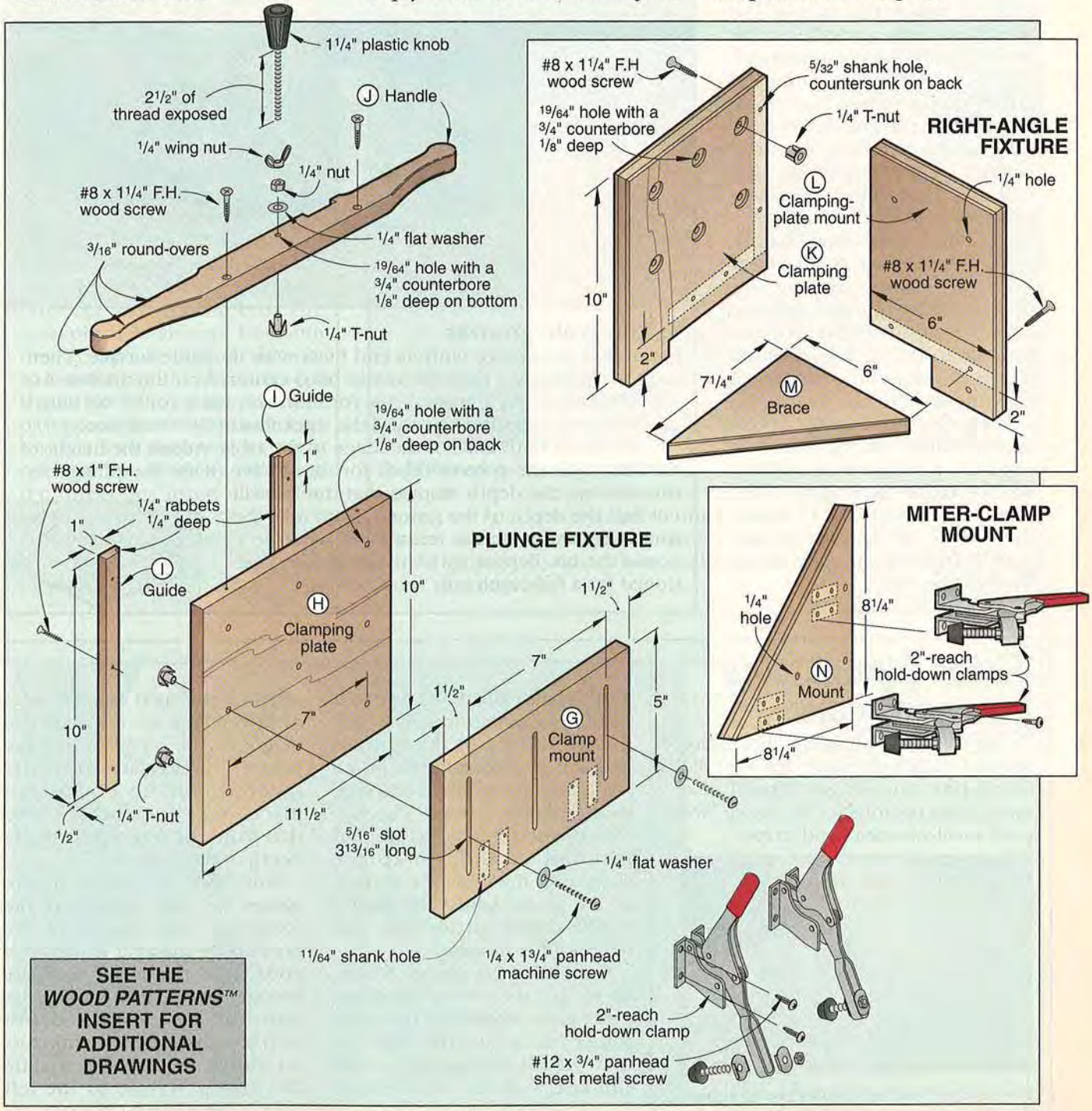
2 Drill the countersunk mounting holes and T-nut counterbores, and screw the assembly together.

3 Cut the miter-clamp mount (N) to shape. Mark the centerpoints for the three ¼" holes used for securing the mount to parts H and E later. Drill the holes.

4 Position the hold-down clamps on the mount (N), and mark the mounting hole centerpoints. Drill the holes, and screw the hold-down clamps in place.

5 If you'll be using the Incra Jig, cut the Incra Jig mount (O) from ¾" plywood. Cut it 8" wide *by the same length as your router table.* Secure the jig to the mount (O) and to the fence support (B).

6 Remove all of the hardware (except the T-nuts) from the assemblies. Sand each smooth and add the finish. (We sprayed on a couple coats of lacquer.)



SEE THE *WOOD PATTERNS*™ INSERT FOR ADDITIONAL DRAWINGS

Written by Marlen Kemmet Project Design: James R. Downing Illustrations: Roxanne LeMoine; Lorna Johnson Photographs: Studio Au

How to use the multi-joint jig

Setting up for three different in-line operations

To configure the jig for in-line operations (those routing operations in which the face of the workpiece travels parallel to the fence), place the horizontal-sliding fixture into the rabbeted guides on the fence. Then, slide the plunge fixture down over the horizontal fixture until the bottom edge of the plunge fixture sits flush with the surface of the router-table surface.

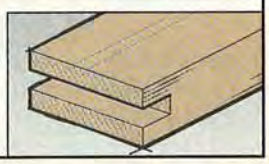
Although the horizontal fixture can be used alone for most in-line operations, we use the plunge fixture to make multiple passes when a full-depth cut may strain the router. Multiple passes also lessen your chances of burning a bit.

Next, attach the clamp mount to the plunge fixture with two ¼×1¾" panhead machine screws. Leave the bottom of the clamp mount about 1" above the surface of the table to prevent it from being chewed up by the router bit.

1. End-grain grooves

Clamp the workpiece with its end flush with the table surface. Then, slide the fence over until the router bit is centered on the thickness of the workpiece. (As a general rule for mortises, use a router bit with a diameter that measures one-third the thickness of the workpiece.)

Now, clamp both ends of the fence to the table. Adjust the height of the bit to get the correct depth for the groove. Raise the plunge fixture and set the depth stop so that the bit will cut half the depth of the groove. Then turn the router on, and push the fixture and workpiece across the bit. Repeat with the workpiece positioned for a full-depth cut.



Three plunge cuts you can make

To get started in plunging operations, set up your jig the same way you did for in-line operations. You'll also need a pair of stops for the fence. We used small wooden handscrews.

The tapered hold up enables you to secure the plunge fixture in the up position. To release, simply push out with your thumb.

1. Vertical plunge mortise

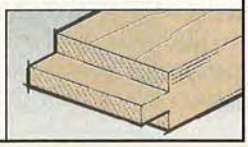
Attach the clamp mount to the plunge fixture in the upright position as shown in the photo *right*, and clamp the workpiece to the plunge fixture. The bottom of the plunge fixture and the end of the workpiece should sit flush on the surface of the table. Adjust the height of the router bit to equal the depth of the mortise.

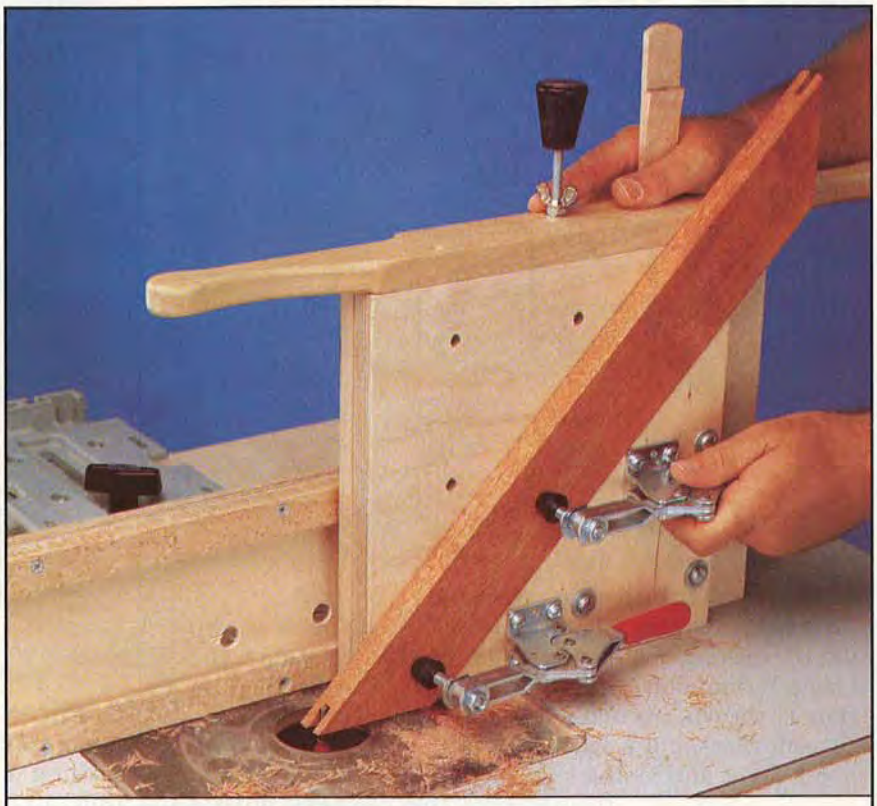
Next, raise the plunge fixture up so that the end of the workpiece is just above the tip of the router bit. Adjust the fence so that the bit is centered in the thickness of the workpiece. Clamp small handscrews or stops on the right and left sides of the fence to control the length of the mortise. Pull the plunge fixture up until the tapered hold-up clicks into place. Set the depth stop so that you cut one-third of the depth of the mortise.

Now, slide the plunge fixture against the right stop. Turn the router on, and disengage the hold-up by pushing it out with your right thumb. Lower the plunge fixture and workpiece onto the bit until the depth stop hits the top of the horizontal-sliding fixture. Then slide the plunge fixture to the left until it butts against the stop.

2. Stub tenons

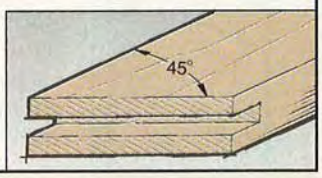
To make a stub tenon, follow the instructions for making an end-grain groove, only move the fence back so that the router bit cuts the outside face of the workpiece as shown. Unclamp the workpiece, turn it around, and make another pass to cut the other face. (Use multiple passes at different depths if necessary.) You also can cut a setback on the tenon by following the directions listed under the setup for right-angle operations on *page 56.*

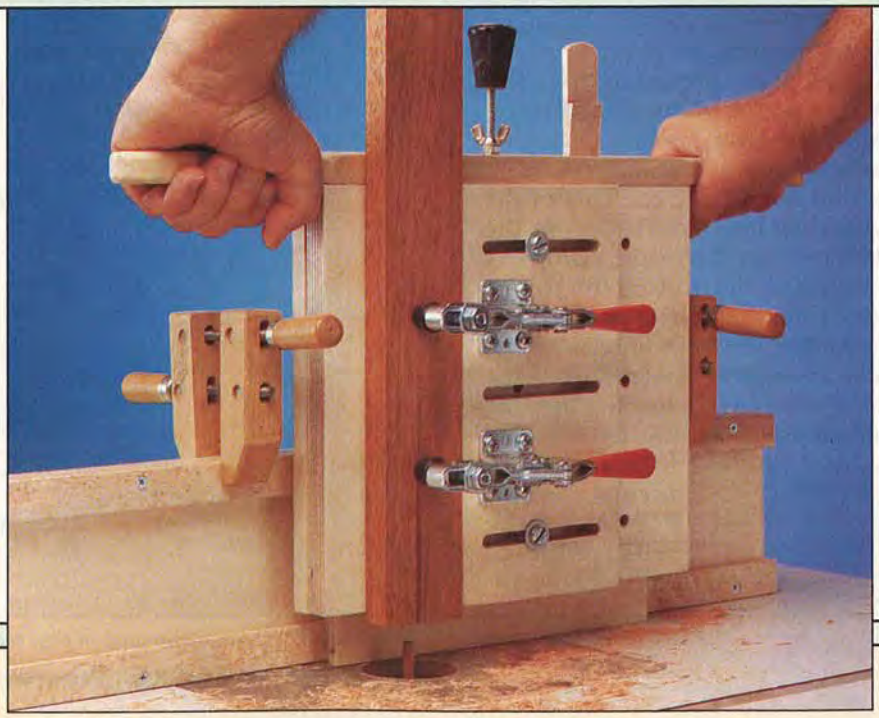


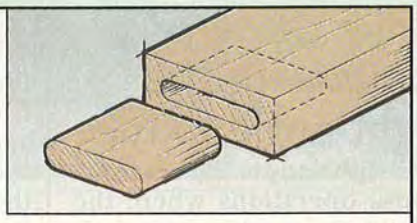


3. Mitered grooves and tenons

To make a 45° mitered version of the previous two cuts, simply remove the clamp mount and attach the miter-clamp mount to the plunge fixture. Then, follow the same procedures.

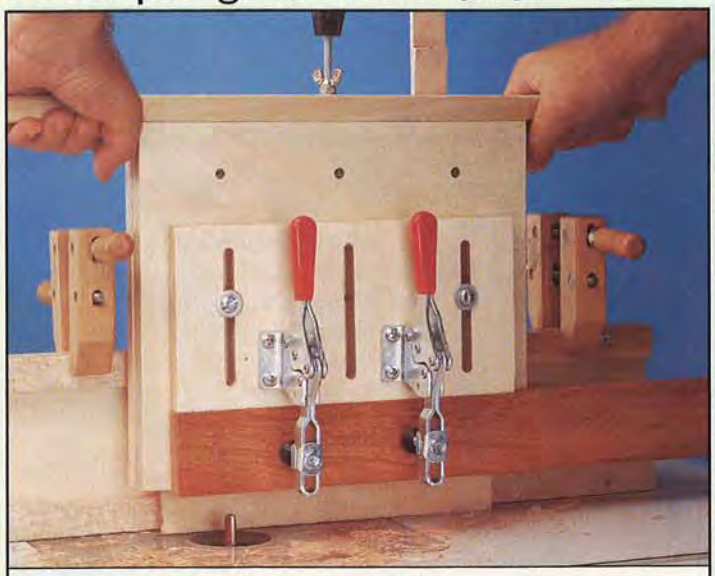






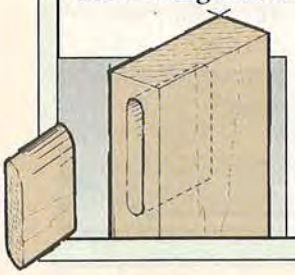
Raise the plunge fixture until it engages the hold-up. Reset the depth stop so that your next plunge cut will equal two-thirds of the depth of the mortise. Now, repeat the plunging operation. On the third or final plunge, reset the depth stop so that the plunge fixture and the end of the workpiece come down flush with the surface of the router table. *Continued*

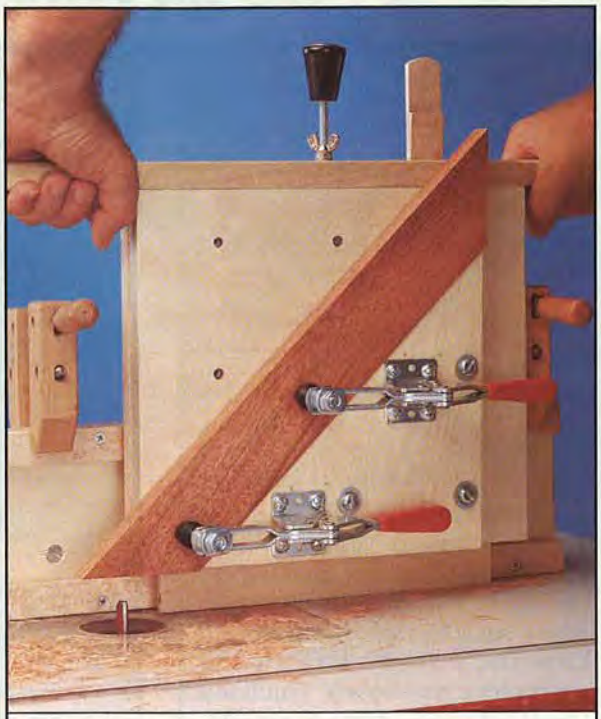
Three plunge cuts *Continued from previous page*



2. Horizontal plunge mortise

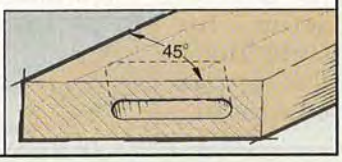
To make this cut, follow the same procedures as you did for making a vertical plunge mortise. But attach the clamp mount and the workpiece in the horizontal position as shown. To make the loose tenon that joins the two mortises, cut a piece of stock as wide as the mortise is long and as thick as the mortise is wide. Then, round-over the corners with a router and a round-over bit to match the profile of the mortise. You can make these loose tenons in long pieces and then crosscut them to the size you need for the individual joints.





3. Miter plunge mortise

Again, follow the same set-up procedures for making a vertical plunge mortise, only this time attach the miter-clamp mount. Be sure not to rout the mortise so deep that the bit penetrates the edge of the workpiece near the outside edge of the miter joint.



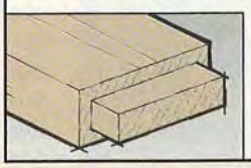
Make these two joints with the right-angle fixture

For right-angle operations (those operations where the face of the workpiece travels perpendicular to the router-table fence) you need to mount the right-angle fixture to the horizontal sliding fixture. Use a pair of ¼×1¾" panhead machine screws to mount the right-angle fixture to the horizontal fixture. Then, attach the clamp mount to the front face of the right-angle fixture, again using two ¼×1¾" panhead machine screws.

1. Tenon setbacks

Place the workpiece against the front face of the right-angle fixture, and slide the clamp mount over until the workpiece is trapped between the clamp mount and the face of the horizontal sliding fixture. Secure the workpiece with the toggle clamps.

Now, raise the router bit to the length of the tenon and position the fence so that the bit will remove the correct amount of material from the edge of the tenon cheek. Turn the router on and push the fixtures and workpiece across the bit. Repeat on the other edge of the workpiece.



Continued on page 88

FAR EAST
DESK CHIME
Soothing sounds in exotic surroundings

Inspired by torii, traditional ceremonial arches of Japan, this intriguing table-top chime lends an oriental air to any room. And thanks to rods tuned by chime maker Jacob Sokoloff, you can fill that room with soothing musical sounds whenever you wish.

***Note**: Throughout, we refer to nominal hole sizes for dowels. Please measure the actual diameter of your dowels before drilling the 1", ½", ⅜", or ¼" holes. Adjust the hole sizes to fit your dowels.*

Begin with the base and top

1 Rip and crosscut the base (A), lintel (B), and cap (C) to the dimensions shown in the Bill of Materials. We used wenge (see the Buying Guide), but you could use any dark-colored stock.

2 Lay out the 1" holes in the base (A), following the Base Front View and End View drawings. (Find these and other drawings in the *WOOD PATTERNS™* insert in the middle of the magazine.) Note that the holes are not centered from side to side. Refer to the Lintel Bottom View drawing, and mark the centers for the 1" and ¼" holes on the lintel (B).

3 Chuck a 1" Forstner bit into your drill press, and bore the holes in both parts. Change to a ¼" brad-point bit to drill the two smaller holes in the lintel.

4 Tilt your tablesaw blade to 15°. Bevel both edges and both ends of the base (A) and the ends of the lintel (B). Cut the bevels to place the holes on the smaller face of each piece. Tilt the blade to 20°, and bevel the cap (C) ends.

5 Lay out the curve for the cap's top surface, shown on the Cap Front View drawing. To do this easily, stand the part on one edge. Place a strip of masking tape on the edge that faces up; this will make it easier to draw a visible cutting line on the dark wood. At the middle of the taped edge, make a mark ¼" from the top. With a flexible plastic or metal ruler, draw a curve from each end to the mark. Bandsaw the curve, and sand it with a drum sander.

6 Place the cap on your benchtop, the curved side facing down. Center the lintel on the bottom of the cap, the lintel's holes facing up. Glue and clamp the lintel.

Construct the columns

1 Forming the columns and the crossbar calls for cutting and drilling dowel rod. A V-block simplifies these operations, so make one now if you don't already have one lying around the shop. Refer to the Cutting the V-Block draw-

Continued

FAR EAST DESK CHIME

ing to make one from a scrap of 2×4 about 12" long (the length isn't critical).

2 Cut the two columns (D) and the crossbar (E) to the lengths shown in the Bill of Materials. A bandsaw works well for sawing the dowel rods.

3 Mark the positions for the ¼", ⅜", and ½" holes on each column where shown on the Column Front View drawing. (You won't drill the ¼" holes until later, but it's convenient to mark their centers now.) Referring to the Crossbar Front View drawing, mark the centers for the eight 1/16" holes. Also mark the two ¼" holes on the top of the crossbar.

4 Set the V-block on your drill press table. Chuck a ¼" or smaller bit into the drill press. As you lower the bit (the drill press not running), move the block until

Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
A base	¾"	2½"	12¼"	W	1
B lintel	¾"	1¼"	12¼"	W	1
C cap	¾"	1¾"	14¼"	W	1
D column	1" dia.		10⅛"	BD	2
E crossbar	½" dia.		11⅞"	BD	1
F upright	¼" dia.		1⅞16"	BD	2
G pin	¼" dia.		1¼"	BD	2
H mallet rest	⅜" dia.		1"	BD	2
I mallet handle	¼" dia.		8¾"	BD	1
J mallet head	¾" dia.			BB	1

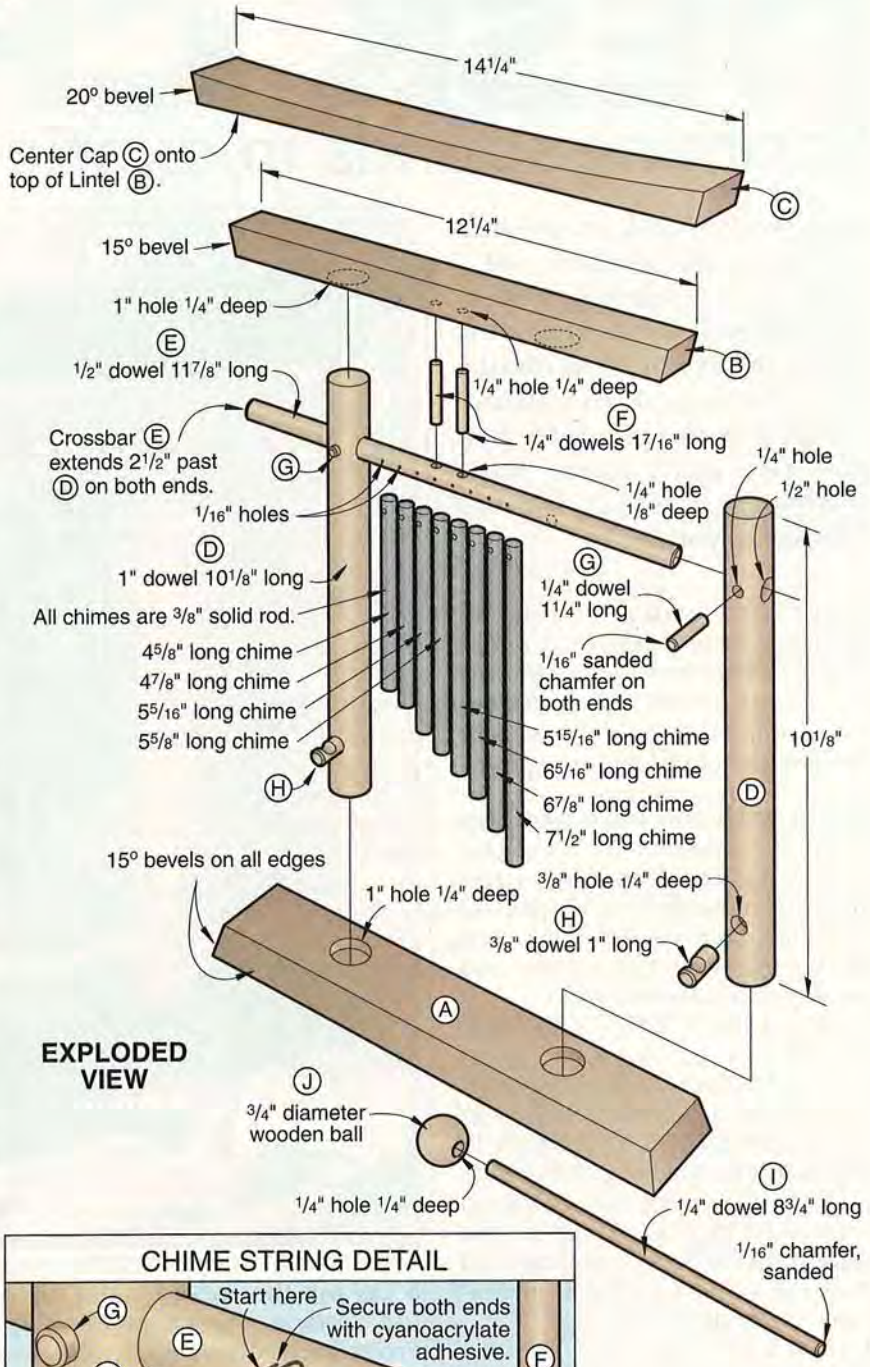
Materials Key: W–wenge BD–birch dowel BB–birch ball

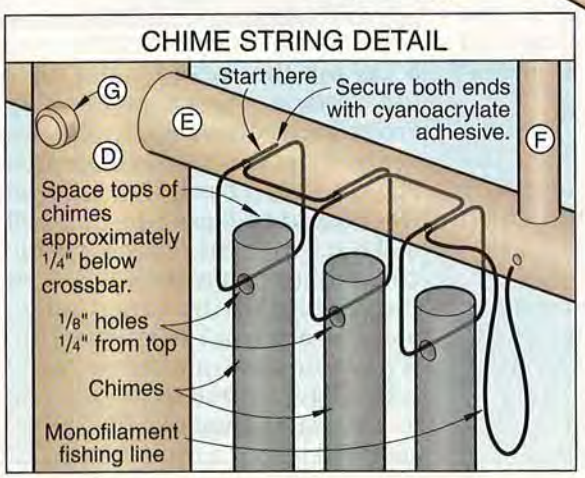
Supplies: woodworker's glue, 20-lb. monofilament fishing line, finishing materials.

Buying Guide

Chime rods. Set of eight hand-tuned, powder-coated aluminum chimes. $14.50 ppd. in U.S. Jacob's Authentic Musical Windchimes, 10615 Bloomfield Ave., Los Alamitos, CA 90720, or call 800/627-5840 to order.

Lumber package. Wenge, birch dowel stock, and a birch ball for one chime frame, item no. W871, $16.95 ppd. in U.S. Heritage Building Specialties, 205 North Cascade, Fergus Falls, MN 56537, or call 800/524-4184.





SEE THE *WOOD PATTERNS*™ INSERT FOR FULL-SIZED PATTERNS

the point of the bit falls right into the bottom of the V-groove, as shown *right*. Clamp the V-block into place at each end. When drilling, secure the dowel rod in the groove with another clamp.

5 Chuck a ⅜" brad-point bit into the drill press. Drill the ⅜" hole ¼" deep in each column. Change to a ⅛" bit, and drill a pilot hole through each column at the point marked for the ½" hole. Then, drill the ½" hole about two-thirds of the way through one column. Rotate the column 180°, and drill in from the other end of the pilot hole to complete the job. Do the same on the other column. This procedure will prevent drill chip-out on the columns.

6 Switch to a ¼" bit, and drill the two ⅛"-deep holes in the crossbar. Rotate the crossbar 90°, and drill the eight 1/16" holes.

Make a few final pieces

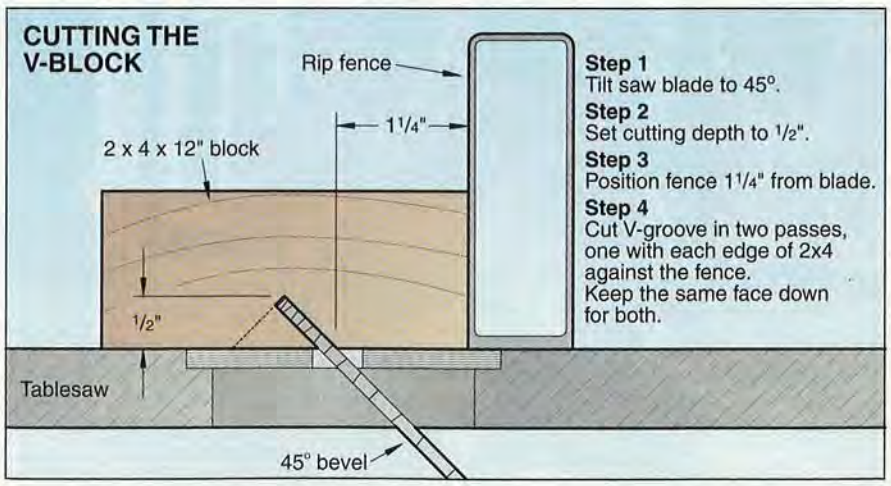
1 Cut parts F and G to the lengths shown in the Bill of Materials. We felt more comfortable cutting these short pieces of ¼" dowel by hand with a dovetail saw; a coping saw would work, too.

2 Starting with a 6"- or 8"-long piece of ⅜" dowel rod for convenience, make the two mallet rests (H). Sand or file a semicircular groove like the one shown in the Mallet Rest Side View drawing ⅜" from each end. Then, cut each rest to length, again using a handsaw for safety.

Center a V-block on the drill-press table to hold the columns and crossbar for accurate drilling.

3 Cut the mallet handle (I) to the length shown. For the head of the mallet drill a ¼" hole ¼" deep into a ¾"-diameter hardwood ball. Here's a simple jig for drilling the ball: Remove the V-block from your drill-press table. Clamp a piece of scrapwood (another piece of 2×4 would be fine) to the table. Drill about ½" deep into the scrapwood with a ½" bit. Change to a ¼" bit, then set the ball into the hole and grip it with a small handscrew or C-clamp while you drill the hole.

4 Finish-sand all parts. Sand chamfers on both ends of the crossbar (E) and the pins (G) and on the notched end of the mallet rests (H). Chamfer one end of the mallet handle.



Now, assemble the chime

1 Dry-assemble the base and columns. Slide the crossbar into place, and insert the uprights (F) into the holes in the crossbar. Dry-assemble the lintel and cap unit, positioning the crossbar so the uprights fit into the lintel holes.

2 Drill the ¼" holes for the pins (G) through the column-crossbar joints. (These are the holes you marked earlier, but didn't drill.) To drill them, lay the assembly on your drill-press table, placing a piece of ¾"-thick scrapwood about 9×9" beneath the columns for support. Drill a pilot hole, then drill the ¼" holes from both sides to prevent chip-out.

3 Insert the pins (G) into the holes. They'll probably fit snugly enough that they won't need glue.

4 Remove the base from the assembly. Put glue into the holes, and reinsert the columns. Similarly, glue the lintel and cap assembly into place. As you install it, capture the uprights (F) between the crossbar and the lintel. Clamp with bar clamps.

5 Glue the mallet rests (H) into the holes in the columns. Turn them to align the notches so you can lay the mallet in them.

6 Apply a clear finish to the completed chime frame and the mallet. (We used tung oil.)

7 Install the chime rods on the crossbar, following the Chime String detail. Thread one end of a 4' length of 20-lb. monofilament fishing line through the first chime hole, through the shortest chime rod, then back through the hole. Pull it through so the end of the line is flush with the back of the hole and the chime rod hangs about ¼" below the crossbar. Secure the line with a drop of cyanoacrylate adhesive in the hole. Hang all eight chimes with the continuous length of fishing line, then snip off the excess after gluing it into the last hole.

Project Design: Jan Hale Svec
Photograph: King Au; John Hetherington
Illustrations: Kim Downing; Lorna Johnson

Make-believe will abound in this playhouse

KIDS' COUNTRY

Even if you don't make your children or grandchildren anything else this year, surprise them with this winner of a project. We guarantee that they'll spend hundreds of hours in it and cherish every minute. They'll think you're pretty special, too.

Note: *The walls and roof panels disassemble easily when it's time to store away the cottage.*

Start with the plywood front, back, and ends

1 Using the dimensions on the *WOOD PATTERNS™* insert in the center of the magazine and the layout on the Cutting Diagram, mark the outlines for the front and back (A) on ¾" plywood. Mark the door and window openings. (For interior use, we recommend birch or fir plywood; for outdoor use you'll need exterior-grade plywood. Use the best grade available. The time you save not having to fill, sand, and repaint the voids of a less-expensive plywood will make up for the extra expense.)

2 Using a straightedge and a circular saw, cut the front and back panels to size.

3 To form the openings, use a jigsaw fitted with a plywood-cutting blade. Cut the front-door opening to shape, creating the front door (B). Next, cut the window openings to shape. (To avoid drilling blade-start holes when forming the window openings, we made plunge cuts with our jigsaw. To do this, tip the saw as shown in Photo A. Start the saw (if you have a variable-speed jigsaw, start with

a medium to high speed and the blade set for straight reciprocation rather than the orbital motion). With the front end of the saw's bottom plate firmly against the plywood, lower the reciprocating blade into the plywood at the marked line as shown in Photo B. Keeping the front end of the plate firmly against the plywood, continue lowering the saw until the plate is in full contact with the plywood. Make the cut. Cut carefully, and save the cutouts: you'll use them for the windows (C).

4 Using the dimensions on the *WOOD PATTERNS* insert, lay out the outline, notch, and window opening, and cut each end (D) to size. Again, save the cutout from each end panel for the windows.

5 Carefully mark the panel openings on *one* of the four window cutouts (C), and cut the four openings in each window to size. Use a drum sander to sand the rounded corners. Now, using this window as a template, mark the openings on the three remaining windows. Cut and sand the openings in the windows to shape.

6 Mark the openings on the door, and cut them to shape.

7 Rout ⅜" round-overs along the *outside* face of the window openings on the door (B) where shown on the Front drawing. Switch bits, and rout ¼" round-overs along the *outside* face of window-pane openings where shown on the End drawing.

8 Buy a wooden door knob (we used a 1½"-diameter knob), and drill a mounting hole through the door for adding the knob later.

Cut the trim, door panel, and window panel next

1 From ¾" solid stock (we recommend cedar or redwood), cut the window trim (E, F) and door-side trim (G) to size.

2 Using a waterproof glue (we used Titebond II), glue and clamp the solid-wood trim around the window openings.

3 Using the *WOOD PATTERNS* insert for reference, miter-cut the door-top trim (H) to size. Then, mark a 9" and 11" radius on each piece where shown on the drawing. Cut the pieces to shape, and check that the inside radius on the door-top trim is flush with the door opening. Sand the trim to match. Glue and clamp the door trim pieces (G, H) in place.

4 Cut the door bottom panel (I) to the size listed in the Bill of Materials from ¼" plywood. Drill mounting holes, and screw the panel to the back side of the door.

MAKING A PLUNGE CUT WITH A JIGSAW

To start the plunge cut for the window, position the jigsaw on the plywood with the blade not touching the wood but centered over the cutline.

Turn on the saw, and lower the blade into the wood, causing the reciprocating blade to cut through the plywood at the marked cutline.

Now, let's add the battens, shutters, and cleats

1 Cut the corner battens (J, K) to size. As shown on the Front and End drawings, miter-cut the top ends of the battens to match the roofline on the ends (D).

2 Glue and clamp the corner battens (J) to the front and back panels (A), using a scrap piece of ¾" plywood and a piece of scrap batten material to gauge the overhang. See the Cleat detail accompanying the Exploded View drawing for reference. Also make certain that the beveled top tip of the batten is flush with the top edge of the front panel.

3 Glue and clamp the corner battens (K) to the end panels (D). Make certain the mitered top end of the batten is flush with the top edge of the end panel and that the edge of the batten is flush with the outside edge of the end panel.

4 To rout the numerous grooves in the shutters, start by cutting a shutter blank to 22×30" as shown on the Cutting Diagram. Mark a series of lines 1" apart across the front face of the 30"-wide blank. Fit your router with a ¼" round-nose bit. Using a straightedge, rout ⅛"-deep grooves across the front of the shutter blank. For reference, see Photo C for how we used this same setup to rout the shingle facsimiles on the roof panels. Cut the four shutters (L) to size from the large routed blank.

5 Rip ¾" square stock for the roof cleats (M) and corner cleats (N). Miter-cut the top end of the roof cleats (M) to match the notch at the top center of the end panel.

6 Rout a ⅛" round-over along what will be the *inside corner* of each cleat (M, N). See the Exploded View and accompanying Cleat detail for reference.

7 Drill countersunk holes for #8 flathead wood screws through the cleats for securing them to the mating panels. Glue and screw the cleats to the end panels.

Continued

KIDS' COTTAGE

A roof to keep the rain out

1 From ¾" plywood, cut the two roof panels (O) to size. As shown on the *WOOD PATTERNS™* insert, lay out the shingle grooves where dimensioned.

2 Chuck a ¼" round-nose bit in a hand-held router, and adjust it to cut ⅛" deep. Measure from the edge of the router base to the center of the bit, and cut a piece of plywood to this width. Using the plywood strip as a gauge to space a straightedge parallel with each marked line, rout a series of grooves the length of each roof panel (O).

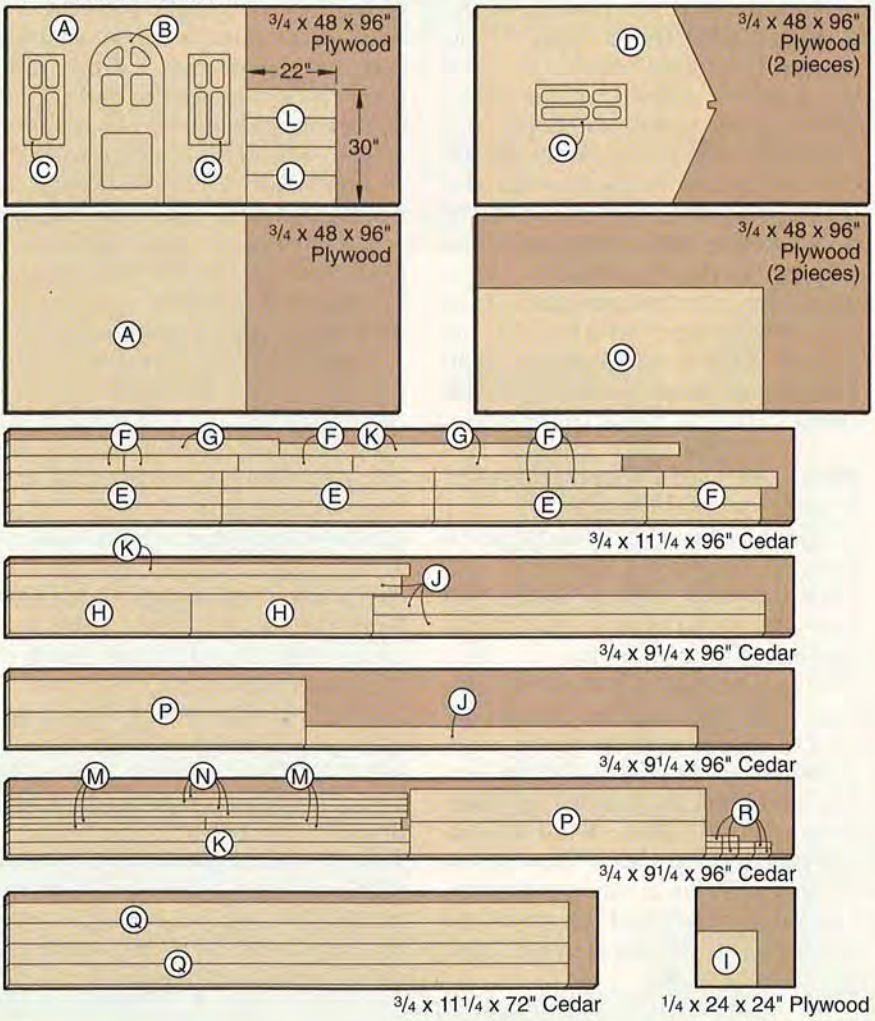
3 Using the straightedge perpendicular to the top and bottom edges of the roof panel, rout the 3¾"-long grooves between the long grooves to form the individual shingles as shown in Photo C.

4 Bevel-rip the top edge of each roof panel (O) at 24°.

5 Cut the roof-end blanks (P) to the size listed in the Bill of Materials. Transfer the full-sized roof-end pattern to one of the blanks. Cut the roof end to shape, and use it as a template to mark the other three pieces. *Continued*

Using a straightedge to guide your router, rout the shingle facsimile lines in the roof panels. We used a ¼" round-nose bit for this procedure.

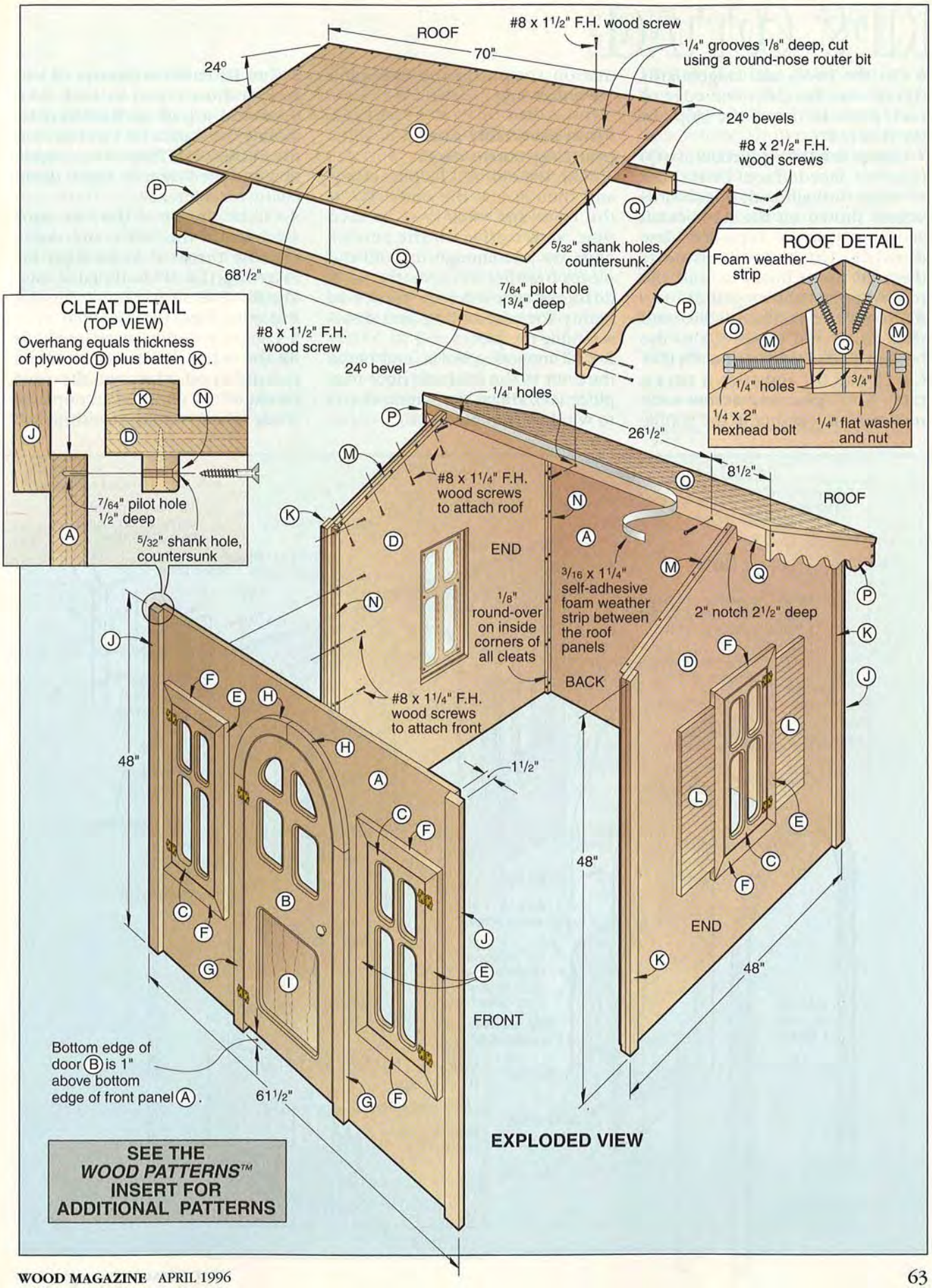
CUTTING DIAGRAM



Bill of Materials					
Part	Finished Size			Matl.	Qty.
	T	W	L		
FRONT, BACK, AND ENDS					
A front & back	¾"	48"	58½"	PL	2
B door	¾"	17⅞"	41"	PL	1
C windows	¾"	9⅞"	21⅞"	PL	4
D ends	¾"	48"	58¾"	PL	2
WINDOW AND DOOR TRIM					
E window sides	¾"	2"	26"	C	8
F window tops & btm.	¾"	2"	14"	C	8
G door sides	¾"	2"	33"	C	2
H arched door tops	¾"	4¾"	22¼"	C	2
I door panel	¼"	13⅜"	14¾"	PL	1
BATTENS, SHUTTERS, AND CLEATS					
J front battens	¾"	2¼"	48"	C	4
K end battens	¾"	1½"	48 11/16"	C	4
L shutters	¾"	7"	22"	PL	4
M roof cleats	¾"	¾"	23⅞"	C	4
N wall cleats	¾"	¾"	48⅜"	C	4
ROOF AND CATCH SUPPORTS					
O roof panels	¾"	30"	70"	PL	2
P roof end blanks	¾"	4"	31¼"	C	4
Q eaves & ridgeboards	¾"	2½"	68½"	C	4
R catch supports	¾"	¾"	2"	C	10

Materials Key: PL–plywood, C–cedar.

Supplies: 1½"-diameter wooden knob, 10 ornamental cabinet hinges (Stanley #1475), 10 magnetic catches and strike plates, ⅛" acrylic for window and doors, #6×½" flathead wood screws, #8×1¼" flathead wood screws, #8×1½" flathead wood screws, #8×2½" flathead wood screws, 3–¼×2" hexhead bolts with washers and nuts, 3/16×1¼" self-adhesive foam weatherstrip, wood putty, acrylic caulk, primer, exterior latex paints.


ROOF
70"
24°
#8 x 1½" F.H. wood screw
¼" grooves ⅛" deep, cut using a round-nose router bit
24° bevels
#8 x 2½" F.H. wood screws
5/32" shank holes, countersunk.
7/64" pilot hole 1¾" deep
68½"
#8 x 1½" F.H. wood screw
24° bevel
ROOF DETAIL
Foam weather strip
¼" holes
¾"
¼ x 2" hexhead bolt
¼" flat washer and nut
CLEAT DETAIL
(TOP VIEW)
Overhang equals thickness of plywood Ⓓ plus batten Ⓚ.
7/64" pilot hole ½" deep
5/32" shank hole, countersunk
¼" holes
26½"
8½"
ROOF
#8 x 1¼" F.H. wood screws to attach roof
END
3/16 x 1¼" self-adhesive foam weather strip between the roof panels
⅛" round-over on inside corners of all cleats
2" notch 2½" deep
BACK
#8 x 1¼" F.H. wood screws to attach front
48"
1½"
48"
END
48"
FRONT
Bottom edge of door Ⓑ is 1" above bottom edge of front panel Ⓐ.
61½"
EXPLODED VIEW
SEE THE WOOD PATTERNS™ INSERT FOR ADDITIONAL PATTERNS

6 Cut the eaves and ridgeboards (Q) to size. Bevel-rip one edge of each piece to match the slope of the roof (24°).

7 Clamp the two ridgeboards (Q) together face-to-face. Drill three ¼" holes through both ridgeboards where shown on the Roof detail accompanying the Exploded View drawing. Later, you'll fit bolts through these holes to pull the roof sections tightly together .

8 Clamp the roof ends (P) and ridgeboard and eaves (Q) to the bottom side of the roof panels (O). Check the fit, and trim if necessary. Now, glue and screw each roof section together in the configuration shown on the Exploded View drawing.

Final assembly and painting come next

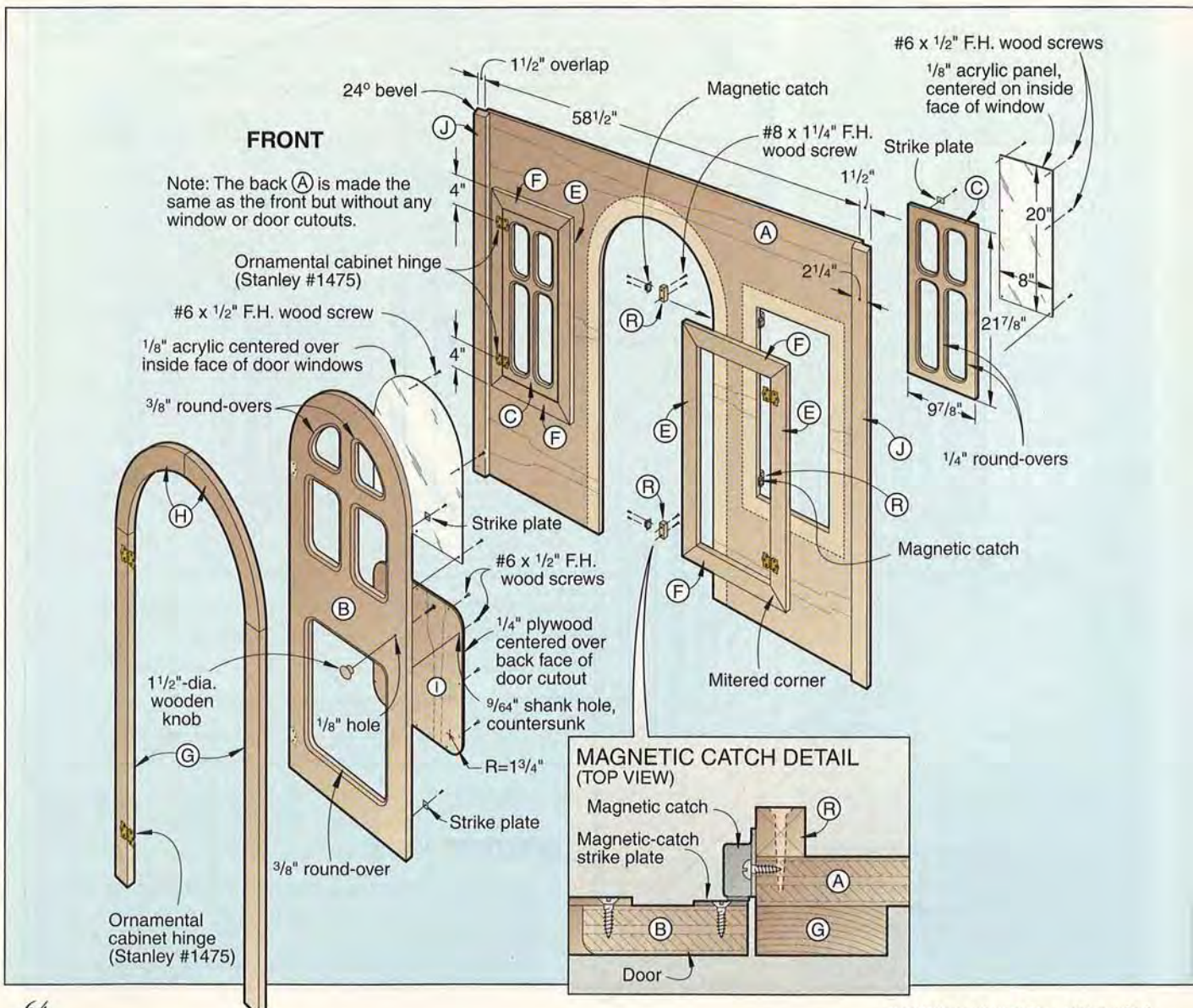
1 With the aid of a helper, clamp and then screw the ends (D) to the front and back (A). To save time, don't drive all the screws now; do just enough to hold the pieces together to check the fit. A cordless screwdriver comes in handy for assembling and disassembling the pieces.

2 Drill mounting holes, and hinge the door to the left-hand door trim piece (G). Hinge the windows (C) to window trim pieces (E).

3 Cut 10 catch supports (R) to size, and use a pair at each window and a pair at the door to mount the magnetic catches. See the *WOOD PATTERNS™* for location and the Magnetic Catch detail *below* for reference.

4 Check the fit of the two roof sections on the walls, and verify that the three ¼" holes align for inserting the ¼" bolts later. See The Roof detail accompanying the Exploded View for reference.

5 Use an exterior wood putty to fill the screw heads and voids in the plywood. (Inspect the roof carefully; we exposed a couple of voids when routing the shingles.



Due to the size of the voids in the roof, we used acrylic caulk to seal them rather than the wood putty.)

6 Remove the catches, strike plates, and hinges from the assemblies. Prime all the wood pieces (we used a latex primer). The edges of the plywood and the end grain on the solid stock should have at least two coats of primer, sanded lightly with 220-grit sandpaper between coats. Don't forget to prime the routed edges at the window openings.

7 Using an exterior paint compatible with the primer, paint the house to match the one shown in the opening photograph, or paint it to match the color of your house. (We used an exterior semi-gloss latex for the walls, both inside and out. Then, we used an exterior gloss for the door, windows, trim, shutters, door knob, and roof.)

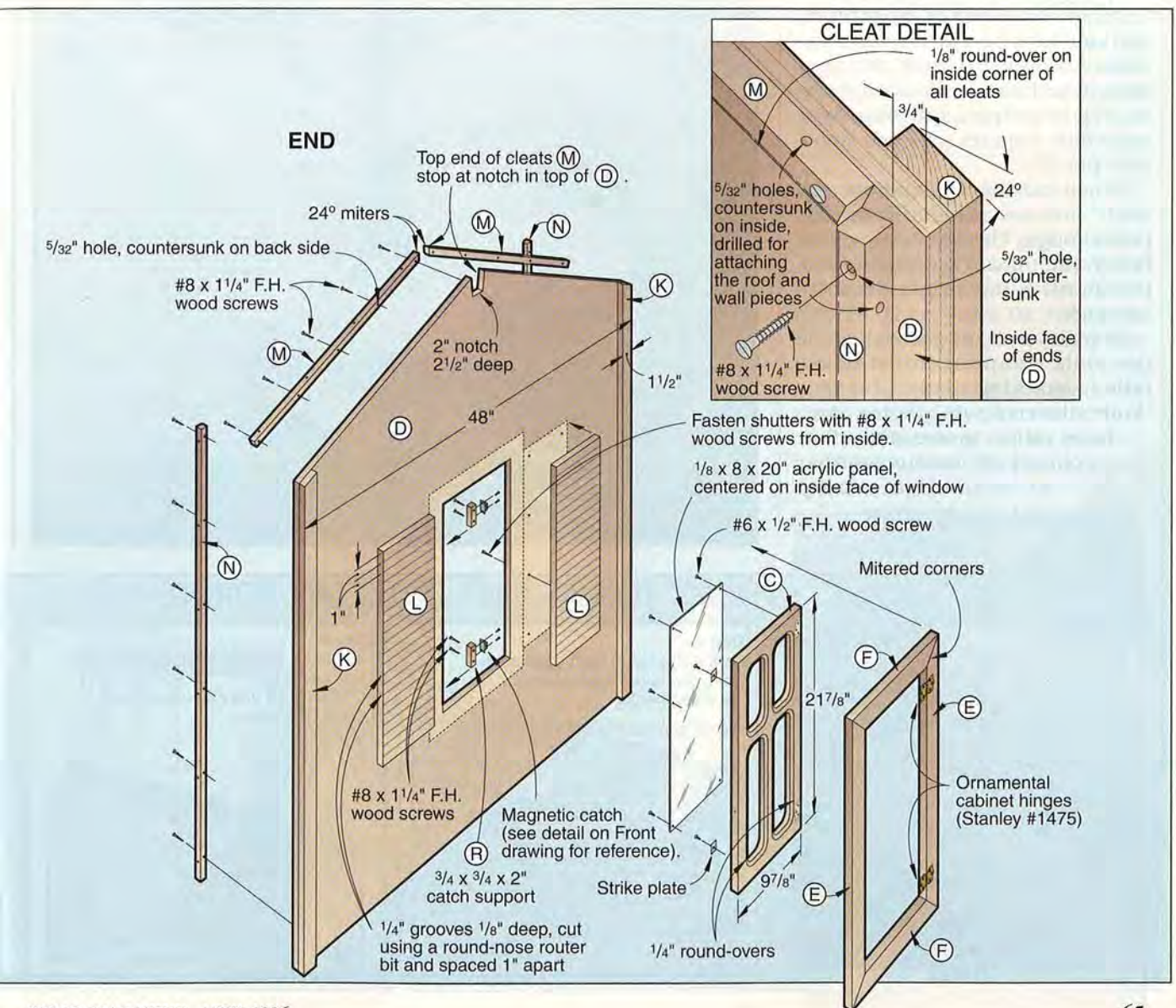
8 Screw the shutters in place.

9 Using a fine toothed-blade, cut ⅛" acrylic for the doors and windows. See the *WOOD PATTERNS* insert for size and shape. Drill mounting holes, and secure the acrylic in place with #6×½" flathead wood screws. Be careful not to over-tighten the screws; too much pressure can cause the acrylic to crack.

10 Reattach the door and windows. Adhere the weather strip to one edge of an assembled roof section where shown on the Roof detail accompanying Exploded View drawing.

11 With the aide of a helper, reassemble the cottage front, back, and ends. Check for square. Position the roof sections in place. Then, use three ¼" bolts and nuts to pull the roof-sections/ridgeboards tightly together. Secure the roof sections to the cleats (M) with #8 wood screws.

Written by Marlen Kemmet
Project Design: James R. Downing
Photographs: King Au
Illustrations: Kim Downing; Lorna Johnson


CLEAT DETAIL
1/8" round-over on inside corner of all cleats
3/4"
24°
5/32" holes, countersunk on inside, drilled for attaching the roof and wall pieces
5/32" hole, countersunk
#8 x 1 1/4" F.H. wood screw
Inside face of ends
END
Top end of cleats M stop at notch in top of D.
24° miters
5/32" hole, countersunk on back side
#8 x 1 1/4" F.H. wood screws
2" notch 2 1/2" deep
1 1/2"
48"
Fasten shutters with #8 x 1 1/4" F.H. wood screws from inside.
1/8 x 8 x 20" acrylic panel, centered on inside face of window
#6 x 1/2" F.H. wood screw
Mitered corners
1"
21 7/8"
Ornamental cabinet hinges (Stanley #1475)
#8 x 1 1/4" F.H. wood screws
Magnetic catch (see detail on Front drawing for reference).
3/4 x 3/4 x 2" catch support
Strike plate
9 7/8"
1/4" grooves 1/8" deep, cut using a round-nose router bit and spaced 1" apart
1/4" round-overs

HAND-CUT DOVETAILS

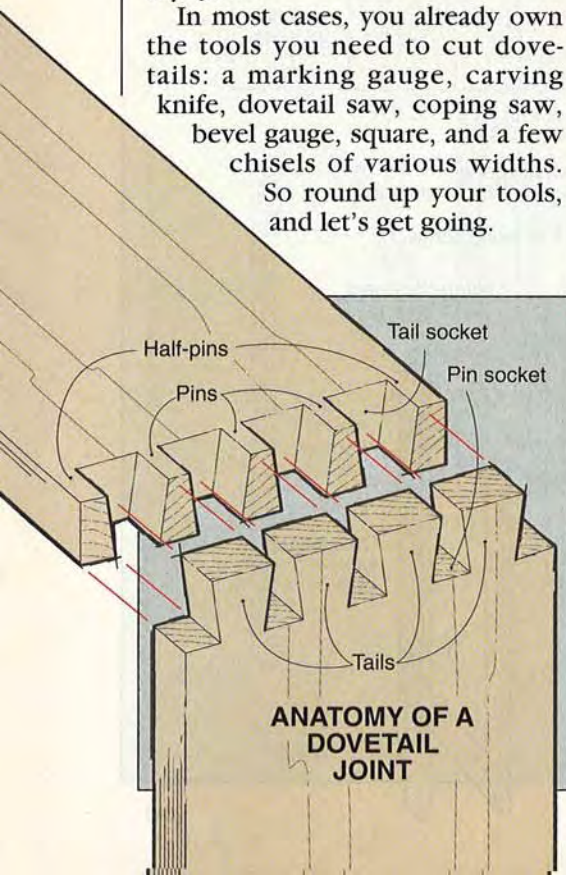
Follow our step-by-step formula for sure success

We don't often cut dovetails by hand in the *WOOD*® magazine shop, mainly because of a lack of time. So when it came time to research this article, we turned to a local friend and furniture maker, Jack Settle. From 1978 to 1991, Jack ran a turn-of-the-century "Carpenter's Shop" at Living History Farms in Des Moines, Iowa and taught thousands of school-age kids how to cut dovetails by hand. According to Jack, learning these time-honored dovetail techniques is simple, and improvement only requires patience and a little practice.

Jack Settle

"When making a box, most students' first dovetail joint is usually pretty rough. The second one gets better, the third is acceptable, and the fourth is downright decent," says Jack.

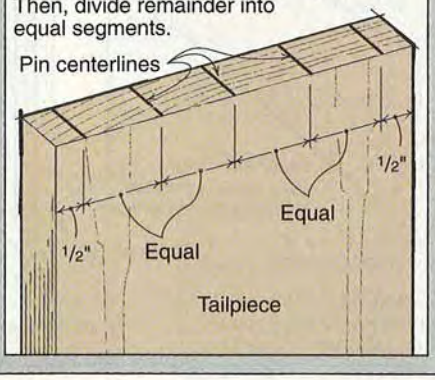
In most cases, you already own the tools you need to cut dovetails: a marking gauge, carving knife, dovetail saw, coping saw, bevel gauge, square, and a few chisels of various widths. So round up your tools, and let's get going.



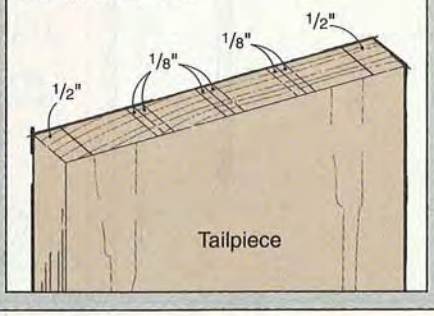
ANATOMY OF A DOVETAIL JOINT

HOW TO LAY OUT DOVETAIL JOINTS

Step A
Mark a line 1/2" in from each edge. Then, divide remainder into equal segments.



Step B
Mark lines 1/8" from the pin centerlines. This results in a 1/4" pin socket–the minimum size you can cut without risking joint failure.

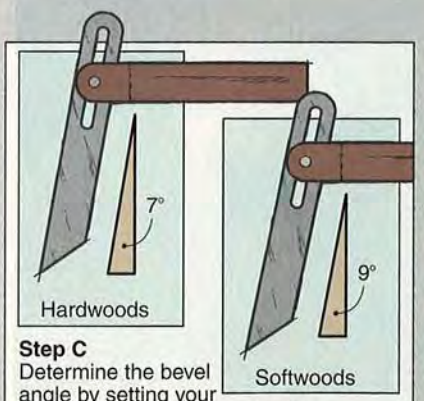


PREPARE THE WORKPIECES

1 Organize the pieces
Start by accurately thicknessing and dimensioning the stock. Then, lay out your pieces to match grain and color around all four sides. To keep the pieces in the proper sequence, Jack uses a simple numbering system. With masking tape he labels the first piece 12, the second piece 23, the third 34, and the fourth 41. Put the tape on the outside face of each piece with the numbers right-side up. Now, as you work make sure each piece touches a piece with the matching number. The "12" piece always sits next to the "23" piece, the "23" piece goes next to the "34", and so on.

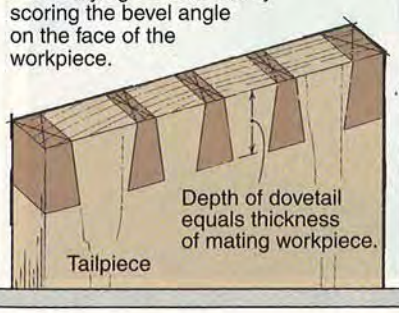
2 Determine joint spacing
When you make hand-cut dovetails, the size and spacing of the tails is left up to your personal preference. In general, you should use the guidelines shown in HOW TO LAY OUT DOVETAIL JOINTS *below.*

But one of the big advantages you enjoy with hand-cut dovetails is that you can create unequally spaced tails, and tails of different widths. By contrast, most machine-made dovetails limit you to the regimented look of equally spaced, equally sized dovetails. So don't hesitate to draw a few experimental layouts on paper first.



Step C
Determine the bevel angle by setting your sliding bevel to a slope of 7° for hardwoods and 9° for softwood.

Step D
Mark an "X" between the 1/8" lines to remind you that these are waste areas. Then, score the lines with a knife. Finish laying out the tails by scoring the bevel angle on the face of the workpiece.



SCRIBE AND CUT THE TAILPIECE

3 Scribe the tail tops
When your spacing and layout are finalized, clamp the stock in a bench vise. Jack uses a knife and a small square to score the cut lines over the pencil marks for the tail tops. The knife cuts a shallow groove that your chisel can easily drop into for final paring later.

4 Scribe the tails on the face
Set your sliding bevel gauge to the angle setting given in Step C of HOW TO LAY OUT DOVETAIL JOINTS. Then, score the face with the knife using the markings from the previous step as starting points. Jack usually lets his knife marks run slightly past the bottom of the joint to give the piece a handmade look. Repeat on the opposite face.

Continued

DOVETAILS

SCRIBE AND CUT THE TAILPIECE *Continued*

5 Scribe the bottom of the joint

First, set your marking gauge to the exact thickness of the mating piece. Then, transfer this measurement to the area to be cut on the outside face of the workpiece by scribing a line across the waste area—the space the pins will occupy. Again, Jack lets these lines run slightly long for the hand-crafted effect. On the inside face, Jack scribes the line all the way across as a reminder of which face is which.

6 Level the workpiece

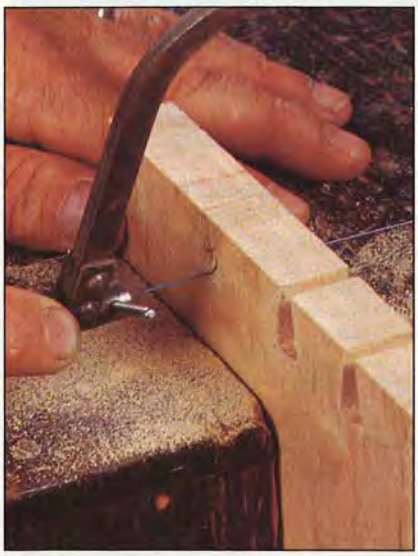
Before cutting, level the top of the workpiece in the vise. As you cut more joints, the level top gives you a constant reference point from which to gauge the correct angle of the saw.

7 Cut the sides of the tails

Place your dovetail saw on the waste side of the knife mark and saw down at the correct angle. Leave enough material, about 1/32", to pare away later with a chisel. Saw down to within about 1/32" of the bottom of the joint. Now, repeat this same cut next to all the scribed lines

8 Remove waste with a coping saw

With a coping saw, cut along the horizontal line at the bottom of the joint to remove the waste. Saw to within 1/32" of the mark made by the marking gauge.



9 Chisel out the bottom

Lay the workpiece flat on the bench, and place the chisel in the groove made by the marking gauge. Tap the chisel to cleanly pare the bottom of the pin socket. Cut just past the middle of the thickness of the workpiece. Flip the piece over and repeat. The goal is to work toward the middle so that the bottom of the joint is either flat or concave by about 1/64" in the middle.

10 Clean up the sides

Reclamp the workpiece in the vise and place the chisel blade in the groove made by the knife. Use gentle pressure to pare towards the middle. Turn the board around and repeat. Again, try to create a flat or slightly concave side. To clean up the intersection of the side and bottom of the joint, switch back to a coping saw and use its fine-toothed blade like a miniature file.

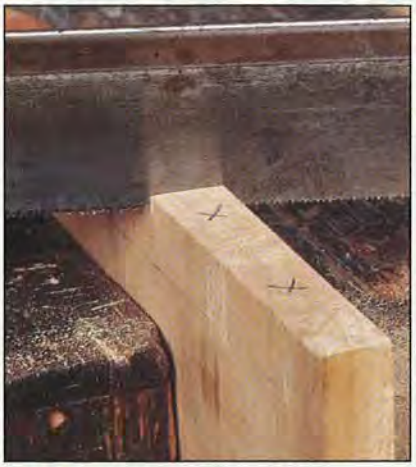
NOW, FASHION THE PINS

11 Clamp, then scribe the layout of the pins

This is the most critical step in the entire process, and the final fit of the joint depends on your accuracy here. Clamp the adjoining pin stock in the vise and line up the top edge of the pin stock's inside face with the bottom of the tails. Clamp the two pieces together with a miter clamp.

Then, mark the tops of the pins with a knife using the sides of the tails as a template. Don't lean the knife or wander away from the guiding side of the tail.

Now, remove the miter clamp, place your square on the top of the pin stock, and scribe the length of the pins on the face of the stock using the knife. (Once again, you can scribe these lines slightly long for the hand-crafted look.) Set your marking gauge to the thickness of the tail stock, and use it to scribe the bottom of the pins across the grain. Mark the waste areas with a pencil, and repeat the procedure on the opposite face.



12 Cut out the pins

With the workpiece firmly clamped and leveled in the vise, cut out the sides of the pins with the dovetail saw. Then, cut out the bottom of the joint with the coping saw. (But be sure to angle the coping saw so you don't accidentally cut into the wider section of the wedge-shaped pins). As in cutting out the tails, leave about 1/32" to pare away later with a chisel.

13 Clean up the pins

Lay the workpiece on the bench, and pare away the waste material at the bottom of the pins with a chisel. Cut toward and not much beyond the middle of the joint. Repeat on the opposite side.

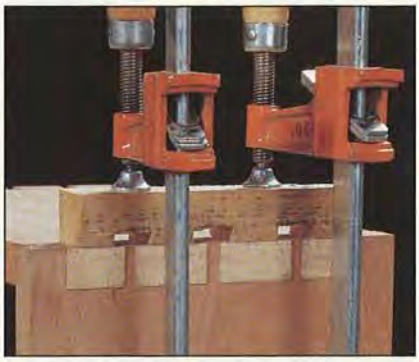
Now, clamp the workpiece in the vise, and pare the sides of the pins, again working toward the middle. Repeat from the opposite side. If needed, clean up the intersection of the side and bottom of the joint with the coping saw.

14 Dry-assemble the pieces

With the pin stock in the vise, tap the tails down between the pins. Use a wooden or non-marring mallet and go easy. If you encounter resistance, tap the joint apart and look for shiny or burnished spots where the joint may have been too tight. Remove these by paring with a chisel or light sanding. Ideally, the joint will fit with a few easy taps of the mallet. If the pins or tails stand slightly above the mating surface, you can level those later by sanding, scraping, or planing. Now, disassemble the joint.

15 Glue and clamp the completed joint

To put clamping pressure directly on top of the tails, cut two clamping blocks from ¾" scrap. Cut openings in the blocks that are slightly wider than the pins. Apply glue to the mating surfaces, position the blocks, and clamp.



Written by Tom Jackson
Photographs: John Hetherington
Illustrations: Kim Downing; Lorna Johnson

BRONZE BEAUTIES

For a finish that looks ages old, you can't beat verdigris, the natural deposits that color weathered brass, bronze, and copper. These two scrollsawn projects wear that distinctive finish, but they sure aren't metal, and we didn't wait on nature, either.

Though they look like antique bronze, the Western Welcome Plaque and the Bucking Bronco Pencil Tray are both scrollsawn wood. The secret? It's a two-part finish that puts the patina of weathered metal on wood—or any other paintable surface. The water-based products, widely available from art-supply and craft-supply dealers (or see the Buying Guide for a mail-order source), go on easily and dry to a durable indoor or outdoor finish.

We'll start with the instructions for building the Western Welcome Plaque and the Bucking Bronco Pencil Tray. Build either one, or both of them. Then, turn to *pages 72-73* to learn about applying the antiqued metallic finish to your project.

Western Welcome Plaque

1 Cut a piece of walnut ½×9×11". Rout a ¼" cove around one face, using a table-mounted router and a piloted cove bit. Rout a keyhole hanging slot on the back. Finish-sand the board. Later, you'll mount the scrollsawn sign on it.

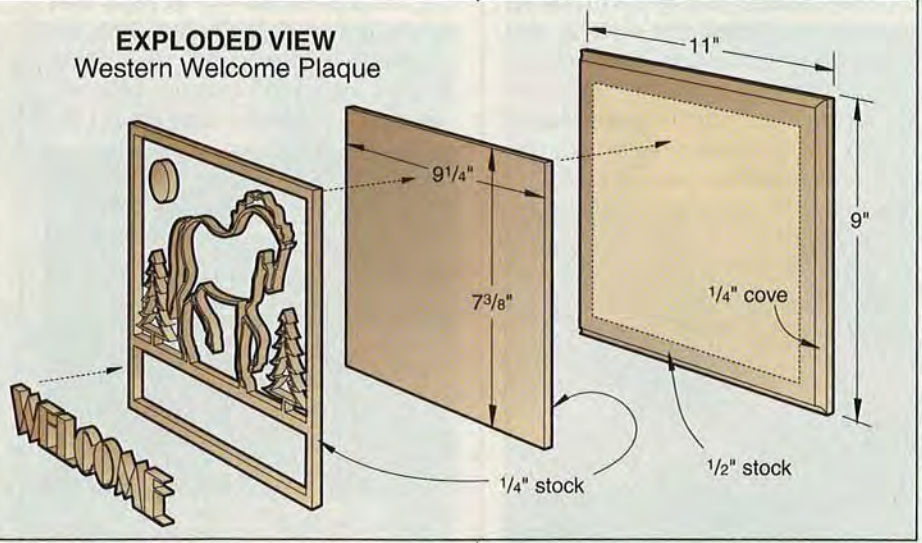
2 Photocopy the full-sized pattern in the *WOOD PATTERNS* ™ insert in the middle of the magazine. Adhere the copy to ¼×8×10" stock. Either Baltic birch plywood or solid stock such as basswood or poplar would be suitable.

3 Drill 1/16" blade start holes where shown. Thread a #4 scrollsaw blade (.035×.015", 15-18 teeth per inch) through the hole in the horse's mane.

4 Saw along the inside line of the mane, leaving the shaded part of the pattern. Similarly cut out the inside portions of the tail, the trees, and the horse's body. Then, cut out the section between the horse's front and hind legs.

To cut a sharp inside corner, such as the one shown at 1 in the Cutting Sharp Turns drawing, saw into the corner from two directions. Make the first cut from the blade start hole into the corner, shown by the lower arrow. Back

EXPLODED VIEW
Western Welcome Plaque



These wooden cutouts have the antique-metal look

the blade out to the start hole, then make an arcing cut through the waste area, shown by the curved arrow, returning to the cutting line just beyond Point 2.

To create a sharp point at 2 and begin cutting the next corner, 3, saw in from the cutout area along the lower *dashed* line. Complete the corner by backing the blade out to the start and making the cut shown by the *dashed* loop.

Continue cutting the remaining points and corners in the same fashion. The arrow at the top of the tree shows another path you can follow when cutting sharp outside points.

5 Insert the blade through the start hole in the letter O, and cut the center out of the letter. Starting from the hole near the W, cut out the individual letters and set them aside.

6 Cut out the rectangular area surrounding the letters at the bottom of the plaque. In the upper part of the plaque, insert the blade through the hole in the corner beneath the lefthand tree.

7 Cut around the tree's outside pattern line. Keep an eye on the inside edge as you work; this will help you maintain consistent width for the tree outline. Continue around the horse and the other tree, then cut along the inside edge of the frame.

8 Cut the sun out of the waste piece. Set it aside until later.

9 Glue the large cutout onto another ¼×8×10" piece of stock. Sandwich the glue-up between two pieces of ¾×8×10" scrapwood (particleboard or plywood would work fine), and clamp.

10 After the glue dries, saw around the outside pattern line. Glue the letters and the sun into place, referring to the pattern.

11 After the glue dries, finish the sign to resemble old, weathered metal, following the finishing instructions on *pages 72-73*.

Bucking Bronco Pencil Tray

1 Photocopy the pattern from the *WOOD PATTERNS*™ insert in the middle of the magazine. Trace the outer line onto a ½×5¾×8½" piece of walnut, and saw around it to create the backboard.

2 Install a piloted ⅛" round-over bit in your table-mounted router. Shape the backboard's front and back edges between the two stop points shown on the pattern.

3 Cut a piece of walnut measuring ¾×3×8¼" for the base. Refer to the Exploded View drawing, then lay out the rounded corners and the through mortise on the top face. Sand the corners round with a disc or belt sander.

4 Drill a ⅛" blade start hole near one corner inside the mortise. Thread a heavy scrollsaw blade through the hole, and saw the mortise. A #11 (.062×.024", 9½-12½ teeth per inch) blade would be a good choice. A wide blade makes sawing straight lines in thick stock easier.

5 Install a piloted ¼" round-over bit in your table-mounted router. Rout both ends and both edges on both sides of the base.

6 Change the router bit to a ⅜" core-box bit, and position a fence ⅜" from it. Cut the pencil groove in the base ¼" deep, taking two or three shallow passes to reach the final depth.

7 Finish-sand the base and the backboard. Set the parts aside.

8 Using spray adhesive or rubber cement, attach the bronco-buster pattern copy to a ¼×4½×6½" piece of Baltic birch plywood. (You could use solid stock instead, if you wish.) Center the pattern on the wood, and trim away the edges.

9 Drill 1/16" blade start holes where shown. Thread a #4 blade

Continued on next page

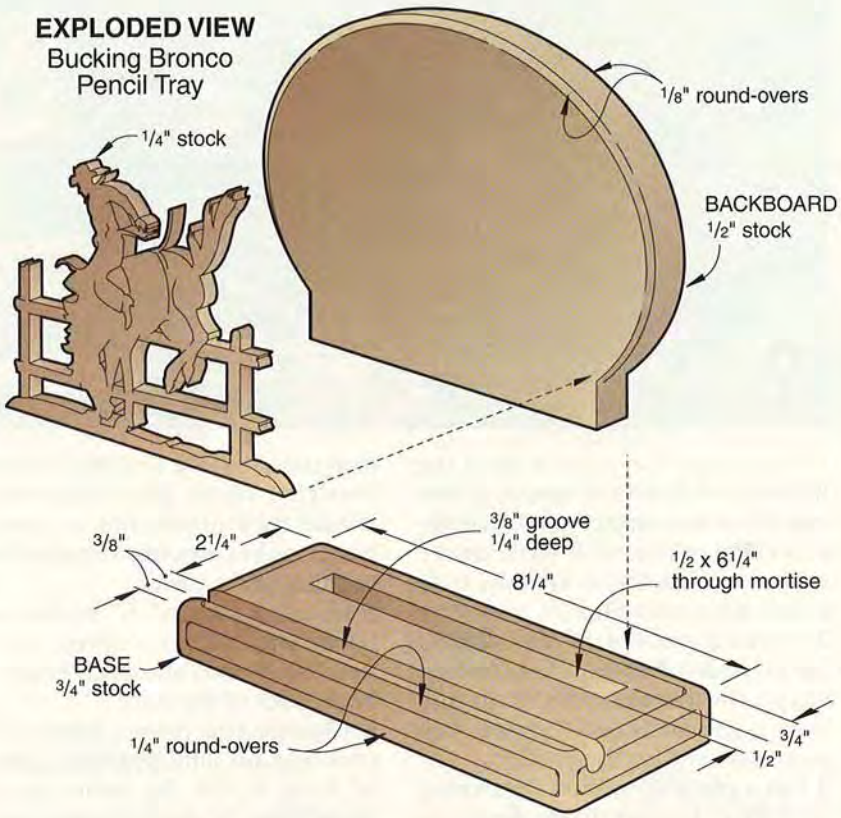
SEE THE *WOOD PATTERNS* INSERT FOR FULL-SIZED PATTERNS OF BOTH PROJECTS

BRONZE BEAUTIES

(.035×.015", 15-18 teeth per inch) through the hole in the smallest area between the horse and fence. Then, complete the rest of the inside cuts, working from the small ones up through the largest. (See Step 4 of the Western Welcome Plaque instructions for some tips on cutting the sharp corners.)

Saw along the inside stopped lines as you come to them. Be careful not to cut past the end of any line; when you reach the end, either back the blade out the kerf to the starting point or spin the workpiece around and saw out of the kerf.

10 Scrollsaw around the outside pattern line to complete the cutout. Now, see *right* for instructions on how to give the cowpoke silhouette the look of an antique metal casting.



Raccoon River Scrollworks will send patterns for the 5¼×16" scene *above* free to readers who order a catalog from the Buying Guide on the *opposite page*.

Giving wood

To make wood look like antique metal, you first apply a metallic coating to the wood. Then you treat that coating with a reactant solution to create *verdigris*, the distinctive carbonates that color old brass, copper, and bronze. To do this we used Gilded Gold metallic surfacer and Patina Green antiquing solution from Modern Options Inc. of San Francisco. We bought the products from an art-supply store.

The company also markets a coppertone base coat (Copper Topper) and Patina Blue antiquing solution. (The photos *below* show the metallic coatings and the patinas.) The materials come in 8-oz. or 16-oz. bottles. Or, you can buy a Patina Green Antiquing Set, which contains 2 oz. each of Coppper Topper and Patina Green.

You can apply either the blue (*top*) or green patina solution over either the gold (*left*) or copper base coat.

Before you patinate your project, practice on scrapwood with the materials and techniques. Since the patina solution must be painted on to the metallic coating while it's still tacky, you have limited time—perhaps five minutes or so—to brush it on. Work in small areas on larger pieces. Familiarity with the process will help you determine what size area you can cover comfortably.

the metal look

Apply the metallic coating smoothly and evenly to give the project a realistic look. Allow first coat to dry before putting on the next.

Brush on the patina solution while the second coat of metallic paint is still tacky.

Here's the 6-step process

1 Sand the surface and edges of the scrollsawn piece, if necessary. Prime the wood. Do not paint the back where you'll be gluing the cutout to the backboard.

2 After the primer dries, apply the metallic coating. Shake the bottle well to bring the metal particles into suspension, then pour a small amount of the coating into a container for brush application.

A foam brush as shown *above* gives a smooth, even coat. Flow the metallic paint onto the surface, brushing in one direction as far as possible. Turn to a small bristle brush to paint the edges and corners the foam brush can't reach. (For a really smooth finish, you could spray on the metallic coating with an airbrush.)

Allow this first coat to dry for an hour, unless the finished piece will go outdoors. In that case, let it cure for 24 hours.

3 Apply the second metallic coat. Brush crosswise to the first coat to minimize brush marks.

4 Let the second coat dry until it's tacky to the touch, but not wet enough to fingerprint. Then, apply the patina solution. Pour a quantity into a plastic container (it's a corrosive solution, so don't use a metal pan). Put on a light coat with a disposable brush such as the one shown *above right*, a foam brush, or a sponge.

You may not see immediate results. Within a few minutes, however, the surface will begin to discolor. In less than half an hour, you should see true verdigris.

If the patina solution dries without producing a patina or if the patina is splotchy, the metallic paint may have been too dry when you applied the solution. To fix it, wipe off the surface, put on another coat of metallic paint, and apply the patina solution again.

5 To deepen the patina, brush on additional thin coats of patina solution. Allow each coat to dry before putting on another.

6 You can apply a clear topcoat or sealer to protect the patina, if you wish. Allow the final coat of patina solution to cure for four days before applying any sealer. A matte finish will look more natural than a shiny one.

Mount the antiqued cutout

1 Position the antiqued cutout on the plaque or backboard, as appropriate. Make small alignment marks with a sharp awl. You also could mark the location with bits of masking tape.

2 Apply a clear finish to the unpainted wood parts. Leave some unfinished mounting pads for mounting the cutouts.

3 Apply woodworker's glue sparingly to the back of the cutout, then clamp it to the plaque or backboard. Place pads under the clamp jaws to protect the patination. If you spray the project with an overall finish, wait until the patina has cured completely.

Buying Guide

Patination supplies. Copper and gold metallic base coatings, about $14 each for 8 ounces; green and blue patina solutions, about $9 for 8 ounces; 2-oz. patina antiquing set, copper and green, about $9; all plus 15% shipping ($3.75 minimum) and sales tax (where applicable), Dick Blick Art Materials, P.O. Box 1267, Galesburg, IL 61402, or call 800/447-8192 for credit card orders; 800/723-2787 for customer service.

Scrollsaw patterns. Catalog of patterns, $2 (refunded with first order), includes one free pattern (shown on *opposite page, bottom*). Raccoon River Scrollworks, Box 2416, Des Moines, IA 50311.

Project Design: Bill Zaun, Raccoon River Scrollworks
Photographs: King Au; John Hetherington
Illustrations: Roxanne LeMoine; Lorna Johnson

WOOD+BRASS=

It's easy to turn a wood-and-brass pull like the one *left* or add a brass accent to a turned object, such as the knob on the vessel lid, *upper left*.

Combining brass with wood sends you down new creative avenues in turning. From functional knobs, pulls, and finials to purely ornamental spindle turnings (make them small enough and they serve nicely as necklace pendants or earrings), a bit of brass enhances any turning.

Shaping brass won't tax your turning skills, either. Using files, shaping the metal is almost easier than turning the wood.

With just a few files you can "turn" brass. File shapes shown from left are mill, round, half-round, and square. At the far right is another round file. Clean the files with a file card, bottom.

GETTING STARTED

First, gather up your tools

Though alike in principle, woodturning and metal turning differ markedly in both tools and techniques. But decorative coves, beads, and tapers don't need to meet machine-shop standards of precision. On brass, you can create those contours readily with a woodworking lathe, employing files instead of cutting tools.

The basic file shapes you'll need, shown *above right*, include mill, round, half-round, and square. Files 10–12" long are convenient, but shorter ones work just as well. You could substitute a triangular file for the square one.

Either bastard or second-cut files will suffice. The less-coarse second-cut files remove metal a little less aggressively and leave a smoother surface than bastard files—advantages when working on small parts. Whether you choose single-cut or double-cut files makes little difference.

Keep a file card handy while you work. This file card isn't a piece of paper, though; it's a stiff, coarse wire brush (shown at the bottom of the photo). Use it to clean soft brass filings out of the file teeth.

Tips on buying brass

Hobby shops, home centers, hardware stores, and auto-supply stores sell various forms of brass suitable for woodturning. You'll find brass rod stock in a variety of sizes. Hobby shops that cater to model railroaders or airplane modelers usually stock several standard diameters up to ¼". Uncoated brazing rod, often sold by auto-supply dealers or hardware stores, works great, too.

Some home centers and hardware stores sell larger-diameter brass rod stock, threaded brass rod, and brass bolts. Be sure, though, that you buy solid brass, not brass-plated steel.

You'll strike a motherlode of brass in the plumbing-supply aisle. Flare nuts, unions, couplings, and other fittings come in various sizes and adapt to many uses. (See the photos on *page 76* for one project.) Short lengths of brass pipe, called nipples, add even more choices.

Get a grip on the brass

Here are two methods for chucking that work for most situations:

Brass on wood. In many instances, you'll turn, or partially turn, a wooden part first, then put a brass piece into a hole drilled in the workpiece or onto a tenon formed on the turning.

That's the approach that works best for turning the lid shown in the inset photo *above left.* First, center the wooden blank for the lid on a wasteblock attached to a 3" faceplate. Rough-turn the lid. (See "Small treasures," *WOOD*® magazine, issue 83, November 1995, for turning instructions and templates for the vessel and lid.)

CLASS You'll take a shine to this turning technique

Drill a 3/16" hole into the center of the lid (don't drill all the way through the blank), then epoxy-glue a piece of brass rod about 1" long into the hole (the rod needs to extend ½" above the finished surface of the lid). To align the rod along the turning axis, rotate the turning by hand, measuring carefully between the end of the rod and the tool rest. You also can use the tailstock center as an alignment aid.

Wood on brass. Projects such as the pull in the photo *opposite page* call for a different tactic. To construct the blank for such items, drill a hole the diameter of your brass part into or through the wooden component. (Brass also looks great with vegetable ivory—tagua nut. See "Tagua turning," *WOOD* magazine, issue 54, September 1992, for more information on turning tagua nuts.)

Insert the brass piece into the hole and epoxy it into place, leaving adequate length to grip in a ½" Jacobs three-jaw chuck (a drill chuck). The brass part, which becomes a feature of the turning, then also serves as the mandrel for turning the wooden piece.

Grip the brass part in a drill chuck mounted on your lathe's headstock spindle. If you don't have a drill chuck for your lathe, attach a wasteblock to your 3-4" faceplate. Drill a hole in the block about 1" deep to accept the rod. Epoxy glue the rod into the hole, and align it along the lathe axis as explained above.

The blank must run true

If you chuck a long, slender rod this way, it may whip around at the free end when you start the lathe. If so, try a slower lathe speed, insert the brass deeper into the chuck to place the heavy wooden part nearer the chuck, or shorten the free end of the rod, project design permitting.

If a lower speed doesn't help and you can't chuck the brass rod deeper or shorten it, make a tailstock bearing to help the turning run true. To make one easily, mount an 8" length of 1" dowel between centers. Using a spindle gouge, turn a taper on one end of the dowel to match the one on your tail center.

Insert the tapered dowel into your tailstock, then slide the tailstock up until the dowel end contacts the point of the drive center mounted on the headstock. Tighten the tailstock so the point makes an impression in the end of the dowel. Slide the tailstock back, then drill straight into the dowel at the marked point, using a bit slightly larger than the diameter of the brass rod (perhaps 1/32" larger). Remount the workpiece, inserting the free end of the rod into the drilled hole.

TECHNIQUES FOR "TURNING"

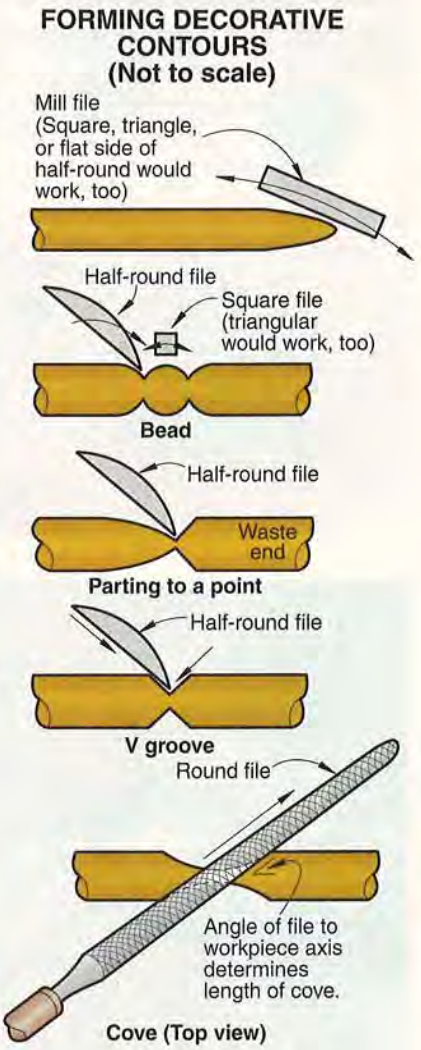
Now, slide the toolrest out of the way. You won't need it for file-forming the brass. Run your lathe at about 1,000 rpm.

Hold the file with both hands—one on or near the handle, one at or near the end. Move the file across the brass at an angle to the lathe's axis whenever possible; this minimizes ridges. A light touch is all you need; pressing too heavily may force the workpiece off center or even bend it.

The file cuts on the forward stroke, so lift it from the work at the end of the stroke. On curved surfaces, push the file across the work and roll it at the same time for a smooth contour. You'll quickly develop a feel for it—the motions come almost naturally. The illustrations *above right* show how to form basic shapes.

Cut V-grooves with the edge of a half-round file, as shown. To soften the transition into the groove, roll the file into it as indicated by the arrow in the Bead drawing.

Form the bead itself by cutting two V-grooves spaced the length of the bead apart. Then, round over the bead as shown.



Hollow out coves with a round file. The angle of the file to the axis of the work establishes the length and radius of the cove. Make parting cuts with the edge of a half-round or triangular file.

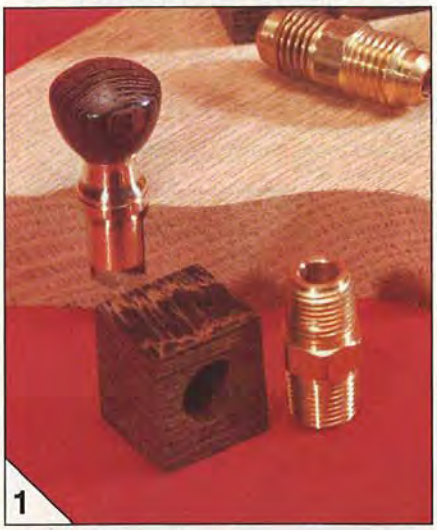
Make it shine

Polish the brass before removing it from the lathe. Remove file marks with progressively finer sandpaper grits from 220 to 600.

Then, dip a corner of a rag into automotive polishing compound, and apply it to the spinning turning. Buff it with a clean rag. Protect the polished metal with a coat of lacquer.

Continued

TURNING A DRAWER PULL


1

In just a few minutes, you can fashion a nifty pull like the one shown *left* in Photo 1 from a brass fitting and a piece of wood. Here's how.

1 We made the pull shown *left* from a ⅛" brass hex nipple and a piece of stock ¾×¾×¾". Other fittings that would work include the ¼" flare union or ¼" compression union shown behind the pull in the opening photo.

2 Grip the brass fitting in a ½" drill chuck mounted on your lathe's spindle, and file the threads off of one end. You could mount the finished pull by epoxying this tenon into a hole, so make it a standard diameter.

2

3 Turn the fitting around, and chuck it by the filed end. Drill a hole in the piece of wood to fit snugly over the threads on the brass part. Put epoxy in the hole, then screw the wood onto the brass fitting.

4 Turn the wooden part to shape. Your normal woodturning tools and techniques will serve for this part of the operation. The soft brass won't hurt your turning tools if you accidentally hit it.

3

5 File-form the brass, employing the techniques explained in the article. As you work, remember that the fitting has a hole through it. Don't file it down too far, or you're likely to break through and ruin the piece.

6 Sand and finish the wooden part of the pull. Then sand the brass, and polish it with automotive rubbing compound or metal-polishing compound. A cotton swab makes a handy applicator for the small pull's contours.

4

5

6

Photographs: King Au; John Hetherington Illustrations: Roxanne LeMoine

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WOOD® Magazine test, Sept. '93, pg. 45

The Proof Is In the Cutting

Both Woodworker II blades performed very well, whether cutting through butter-soft ¾"-thick pine or iron-hard 1¾"-thick ash. The 20° positive hook angle and 15° alternate top bevels give the blades an aggressive attack; we maintained a brisk, uniform feed rate while ripping a variety of woods on the powerful Unisaw and experienced no discernible resistance or slowing. On the smaller saws, switching to the thin-kerf blade allowed very similiar feed rates, again with barely noticeable resistance.

Although we've used blades that cut faster, their cut quality couldn't touch what we got with the Forrest blades. On solid stock, ripped edges came off our saws jointer-finished, smooth and slick with no visible teeth marks—good enough to edge-glue without additional machining. Crosscuts came out crisp and clean with no fuzzing or tiny splintering.

The Bottom Line

Performance of the Woodworker II is impressive enough that you could bolt this versatile, general-purpose blade on your saw and use it for virtually all of your cutting operations.

SHOP TEST, Woodworker's Journal Nov./Dec. '95 pg.78

CHOPMASTER FOR SLIDING COMPOUNDS & MITER SAWS

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Hitachi 8-1/2"x60Tx5/8"	$179	$109
DeWalt 8-1/2" & Ryobi 8-1/2"x60Tx5/8"	$179	$109
Delta 9"x80Tx5/8"	$204	$119
Ryobi–Makita & all 10"x80Tx5/8"	$207	$129
DeWalt, Makita, B&D, Hitachi 12"x80Tx1"	$229	$139
Ryobi–Makita 14"x100Tx1"	$266	$179
Hitachi 15"x100Tx1"	$277	$189

For good general purpose cuts use Woodworker II 30T & 40T or Woodworker I. Use small stiffener where possible.

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12"x60Tx1" or 5/8" 1/8"K	$198	$139
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Circle No. 1322

TOOL BUYER'S UPDATE

Grizzly weighs in with a hefty oscillating spindle sander

The market for oscillating spindle sanders has boomed in the last year, and this new entry from Grizzly proves there's still room for another heavyweight. At 300 pounds, this floor-standing model gives you a production-grade oscillating spindle sander at an affordable price.

The Grizzly G1071 closely resembles the Enlon EN3407 oscillating spindle sander tested in the September 1994 issue of *WOOD®* magazine. Powered by a 1-hp, 110/220-volt induction motor, the Grizzly can handle just about any edge-sanding chore you throw at it. And the drive unit is totally enclosed in an oil bath for a lifetime of service.

The 25⅛"-square cast-iron table provides plenty of support for large workpieces, and it tilts 45° forward and 20° back. The three table inserts included with the machine do not fit as flush with the tabletop as I'd like to see, but this slight irregularity did not affect my sanding performance or quality.

This machine also includes 10 spindles that range in size from ¼" to 4" in diameter. The five larger spindles on the machine I tested, those with rubber drums, were not perfectly round and tended to thump against the workpiece. They still sanded well, but the vibration was bothersome.

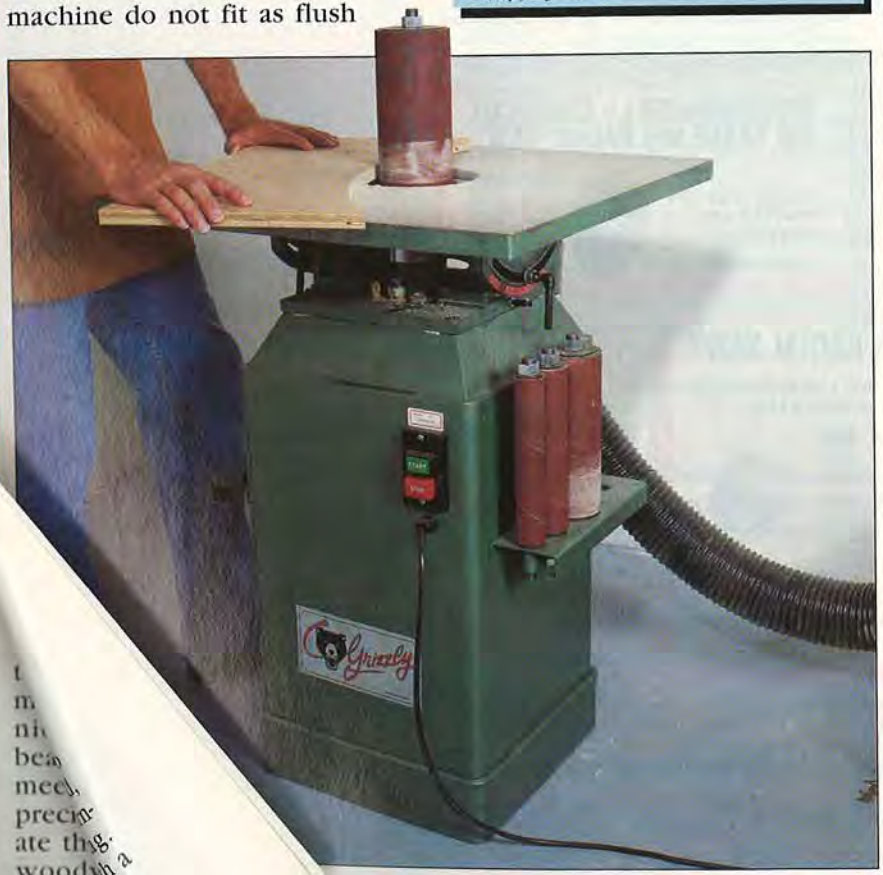
—Tested by Bob McFarlin

PRODUCT SCORECARD

Grizzly G1071 Oscillating Spindle Sander

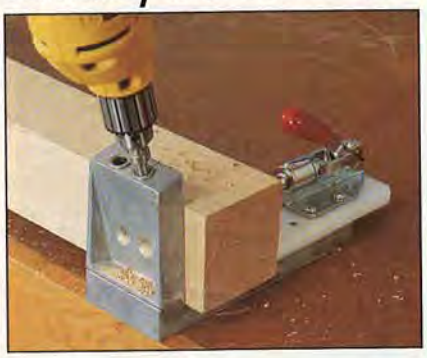
Performance	★ ★ ★ ☆ ☆
Price	$495 plus shipping
Value	★ ★ ★ ★ ★

Grizzly Imports, P.O. Box 2069, Bellingham, WA 98227. West of the Mississippi River, call 800/541-5537. East of the Mississippi River, call 800/523-4777.



continued 75

Kreg Jig improvements add versatility and ease of use



In the January 1995 article on pocket-hole joinery, we chose the Kreg jig as the preferred tool. Since that time, the company has added a few improvements that make this jig even better.

For starters, the new jig includes a pair of chip-extraction holes located on the back side of the vertical surface. These ports ease the drilling by providing an escape route for chips and prevent overheating of the drill bit. If you already own an older model Kreg Jig, the company may be able to retrofit yours with the holes for less than $20. Call the number *below* for information.

The company also introduced an accessory extension plate for $8.95 that allows you to reposition the toggle clamp so you can clamp stock up to 3" thick—compared to a clamping capacity of 1½" without the plate. And finally, you can now buy cobalt-steel drill bits to use with the jig for $34.95. Heavy users will appreciate the fact that these bits are harder and longer lasting than high-speed steel, but less expensive than tungsten carbide.

—Tested by Tom Jackson

PRODUCT SCORECARD

Kreg Jig model K2

Performance	★ ★ ★ ★ ★
Price	$120
Value	★ ★ ★ ★ ★

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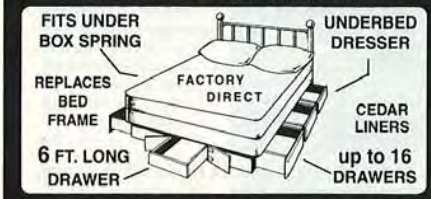

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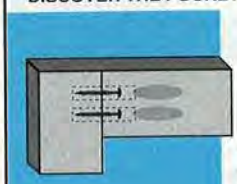

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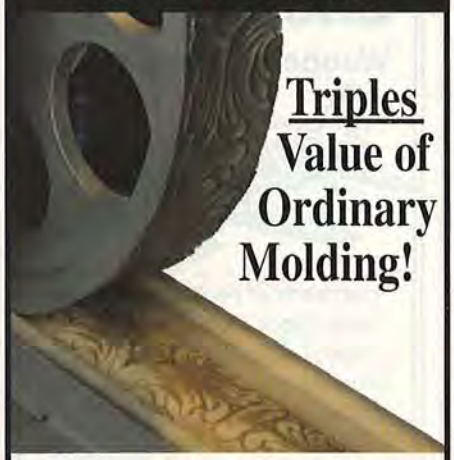

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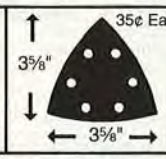

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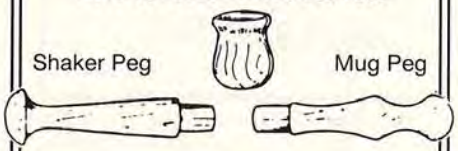

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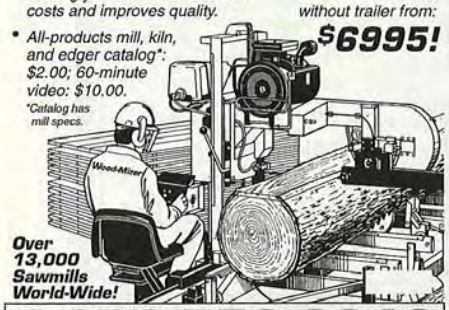

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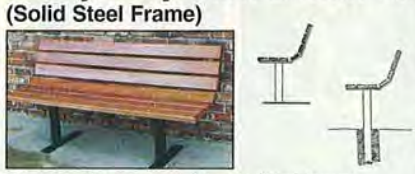

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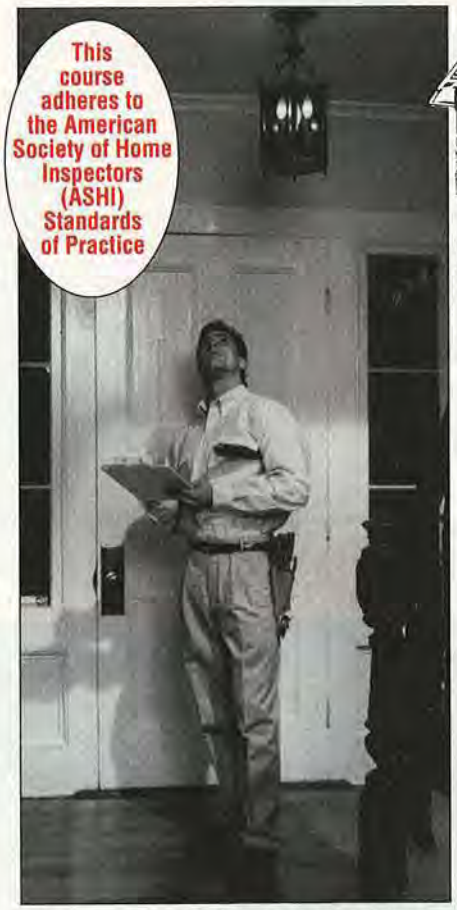

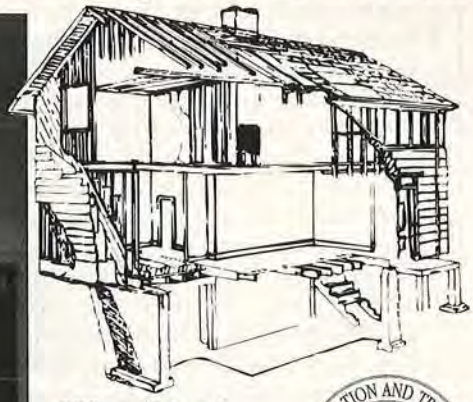

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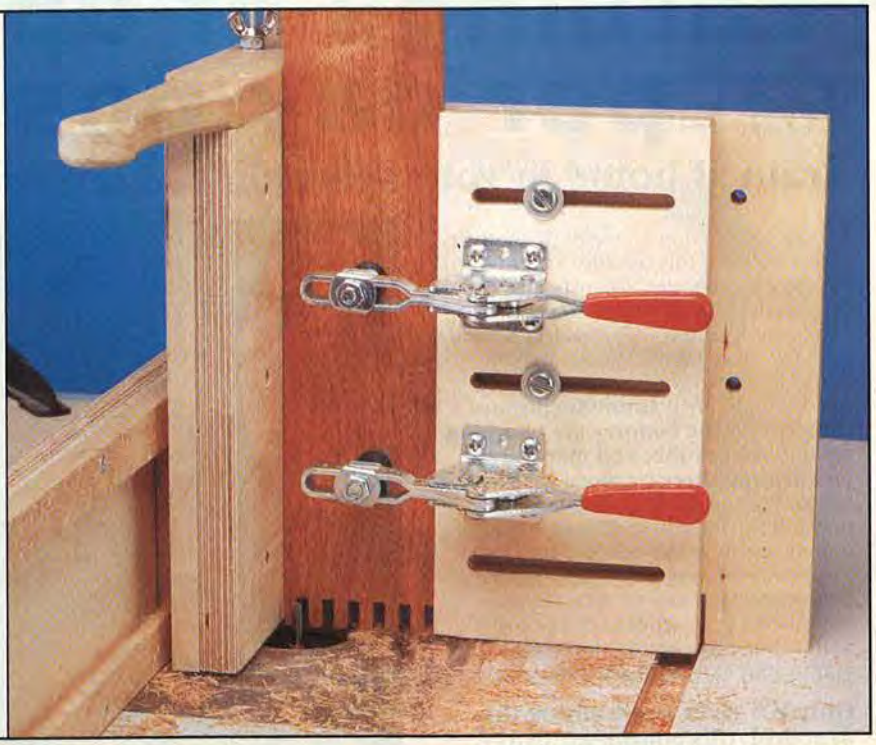
How to use the multi-joint jig

Continued from page 56

2. Box joints

Teamed with an accurate positioning device such as the Incra Jig, our right-angle fixture will cut box joints easily. Set up the right-angle fixture and workpiece the same as for routing tenon setbacks. Now, after routing the first recess, move the fence back a distance equal to twice the diameter of the router bit, and rout the next recess. Continue until you reach the opposite edge of the workpiece. Rout the mating workpiece in the same manner, but remember to offset the first recess so that you end up with interlocking pins and recesses. If you need help calculating the layout of your box joints, see the technique we used on *page* 77 of the August 1992 issue.



Written by Marlen Kemmet and Tom Jackson Photographs: John Hetherington Illustrations: Roxanne LeMoine

The New Grizzly G1022Z

We are proud to offer this "Top of the Line" version of our standard G1022 10" Table Saw, with all the extras of saws costing a lot more. An exceptional value, the G1022Z comes complete with motor, fence, two cast iron extension wings, sturdy stand, blade guard, two blade inserts (one for the regular blade and one for the dado set), and miter gauge.

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Comes With FREE Carbide-Tipped Saw Blade!

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Enter *WOOD*® magazine's 8th Annual Build-A-Toy® Contest *to benefit Toys for Tots*

All entries from the 1996 Build-A-Toy contest will be sold at a public auction in November 1996, and the funds raised donated to the U.S. Marine Corps Reserve's Toys for Tots program to purchase new toys for needy children at Christmas. All Build-A-Toy contest entrants receive a colorful, "I Crafted a Toy for Joy" sticker.

Toys will be judged on Originality, Durability, Craftsmanship, Kid Appeal, Safety, and Finish. Deadline for entries is September 1, 1996. Judging will take place in mid-September and winners will be notified by mail by mid-October. Names of winners will be published in *WOOD* magazine's September 1997 issue.

For complete rules and an entry form, see the October 1995 issue of *WOOD* or write to: Build-A-Toy Rules, *WOOD* magazine, 1912 Grand Avenue, Des Moines, Iowa 50309-3379

Enter a Toy and You're Automatically Entered in Our Drawing!

When you enter a toy in the contest, you're automatically entered in a drawing to receive one of these great prizes:

- **Power Press pipe clamp spreader from American Tool**
- **3M™ Woodworker's Packet** — 3M™ 2" Sanding/Finishing Kit, 3M™ Aluminum Oxide Sandpaper, 3M™ Synthetic Steel Wool, 3M™ Sanding & Fiberglass Insulation Respirator, Scotch™ Painters' Masking Tape
- **WOOD Plan from *WOOD* magazine**

No toy necessary to enter. See Drawing Rules for full details.

PowerPress 3M

1996 Build-A-Toy Contest Prizes

Best Toy Entry
$3,000 in Delta tools
(Original design only, all divisions)

Junior Craftsman
(19 yrs. and younger, all designs)

Grand Prize
$1,500
RBI Hawk Ultra 20" scrollsaw

First Prize
$1,000 in
Skil tools

Second Prize
$750 in
Dremel tools

Third Prize
$500 in
Meisel Hardware merchandise

Home Hobbyist
(original designs only)

Grand Prize
$2,100 in Craftsman stationary machines
(Sears Craftsman 29911 tablesaw, 24634 bandsaw, 21317 drill press, 22590 spindle sander, 29978 sawdust collector)

First Prize
Grizzly tablesaw, jointer, planer, and bandsaw valued at $2,000

Second Prize
$1,000 in
Bosch tools

Third Prize
$500 in
Dremel tools

Professional
(original designs only)

Grand Prize
$2,000 in
DeWalt tools

First Prize
$1,500
Hegner MK4 Accura multimachine

Second Prize
$1,000 in
Bosch tools

Third Prize
$500 in
Porter-Cable tools

Citations (All designs, all divisions eligible)

Best Use of Wood, $575 Milwaukee compound miter saw
Best Model, $250 in Formby's finishing supplies
Best Clear Finish, $250 in Formby's finishing supplies
Best Painted, Dyed Finish, $200 in Red Devil paints
Best Educational Toy, $250 in Craft Supplies merchandise
Best Action Toy, $250 in Woodworker's Store merchandise
Best Pull Toy, $250 in Klockit merchandise

Over $23,000 in tools and supplies to win!

Special Awards

Best Toy from a Woodworking Club (one toy per club): $250 in Leichtung merchandise, $200 in American Tool clamps, $200 in Red Devil paints

Best Entry/Shop Class (no limit on number of toys per class entry): $250 in Delta tools, $1,000 in 3M supplies, $300 in Red Devil paints, $200 in American Tool clamps

1996 CONTEST RULES

1. Toys must fit into a box no larger than 2' x 2' x 2'. The primary material should be wood but may incorporate other materials.
2. Please follow Consumer Product Safety Commission guidelines: nontoxic wood finishes only; no parts smaller than 1 1/4" square on toys for children under three years of age; no sharp corners or points; pull strings longer than 12" should not have beads or other attachments that could tangle and form a loop.
3. Entries must be received by September 1, 1996. All entries must be postpaid; collect entries will be refused. Attach an entry label, photocopy of an entry label, or a 3½" x 5" card with entry information and your name and address to each toy.
4. Woodworkers (except Junior Craftsmen) who build toys from existing plans will be eligible for Citation prizes only. Woodworkers who build their own original designs will be eligible for all prizes.
5. Entry constitutes permission to use winner's name, hometown and photograph for promotional purposes, unless prohibited by law. Contest sponsors, employees and family members of Meredith Corporation, their affiliates and subsidiaries are ineligible. Void in Quebec.
6. Winners will be selected and notified by mail on or about October 15, 1996, and will receive the prize directly from the manufacturer/distributor. Value of prize is suggested retail price. For a list of winners, send a separate, self-addressed stamped envelope to BUILD-A-TOY, 1912 Grand Avenue, Des Moines, IA 50309-3379.
7. Meredith Corporation will donate all entries or auction money received from entries to the U.S. Marine Corps Reserve Toys for Tots program.
8. **For woodworkers who enter their toy as an original design:** Toy must be your own original design. A different approach to an existing toy would qualify. Toys based upon published patterns are not eligible.
9. A panel of representatives from the U.S. Marine Corps Reserve, Meredith Corporation, and woodworking experts will judge the toys on or about Sept. 15, 1996, on child's appeal, craftsmanship, originality, durability, safety, and finish. The panel's decision will be final.
10. Professional woodworkers include woodworking teachers and anyone earning an income by selling wooden items.
11. Winners are responsible for applicable taxes.

DRAWING RULES

1. NO PURCHASE OR CONTEST ENTRY NECESSARY.
2. To enter, fill out the Official Entry Form or place this information on a 3½" x 5 postcard. Up to 25 entries per person allowed. Persons who enter the contest are automatically entered, one entry per toy up to 25 toys.
3. Sweeps begins on September 1, 1996. Entries must be received by September 1, 1996. No responsibility is assumed for lost, late or misdirected entries.
4. Sweeps open to residents of the U.S.A., except employees of Meredith Corporation, contest sponsors, its agents, affiliates, subsidiaries and families.
5. The winners will be selected on or about October 15, 1996. Winners will be notified by mail and prize delivered on or about October 30, 1996.
6. Selection of winners by a random drawing from all entries received will be under the supervision of Meredith Corporation whose decisions are final.
7. Odds of winning depend on number of entries received.
8. Prizes are not exchangeable or transferable. Only one prize per entrant is allowed.
9. Entry constitutes permission to use winner's entry, name, hometown, likeness and photograph for editorial, public relations, promotional and advertising purposes on behalf of Meredith Corporation, unless prohibited by law. Winners will be required to sign an Affidavit of Eligibility and Release of Liability within ten (10) days of notification.
10. Subject to all federal, state and local laws and regulations. Void where prohibited. Applicable taxes are the sole responsibility of the winners.
11. For a list of prize winners (available after October 15, 1996) send a separate, self-addressed, stamped envelope to: Build-A-Toy Sweepstakes, 1912 Grand Avenue, Des Moines, Iowa 50309-3379.
12. Prizes: 25 pipe clamps (retail value $25 each), 25 woodworker's packets (retail value $25 each) and 250 WOOD Plans (retail value $9.95 each).

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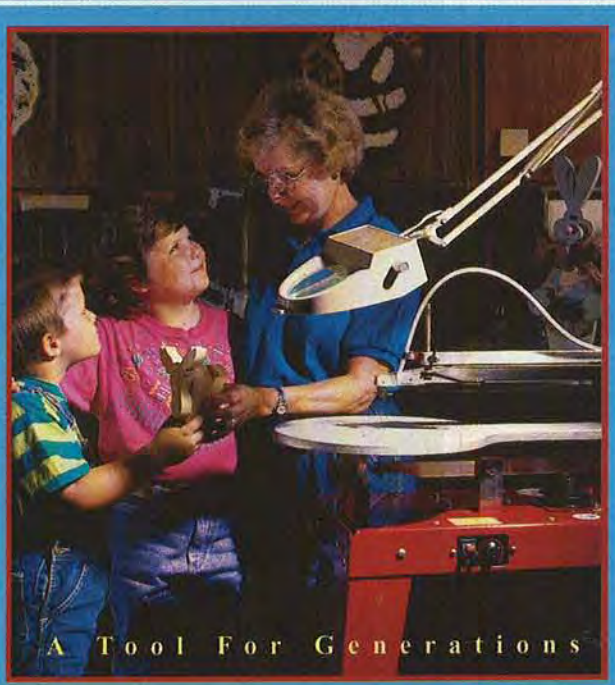

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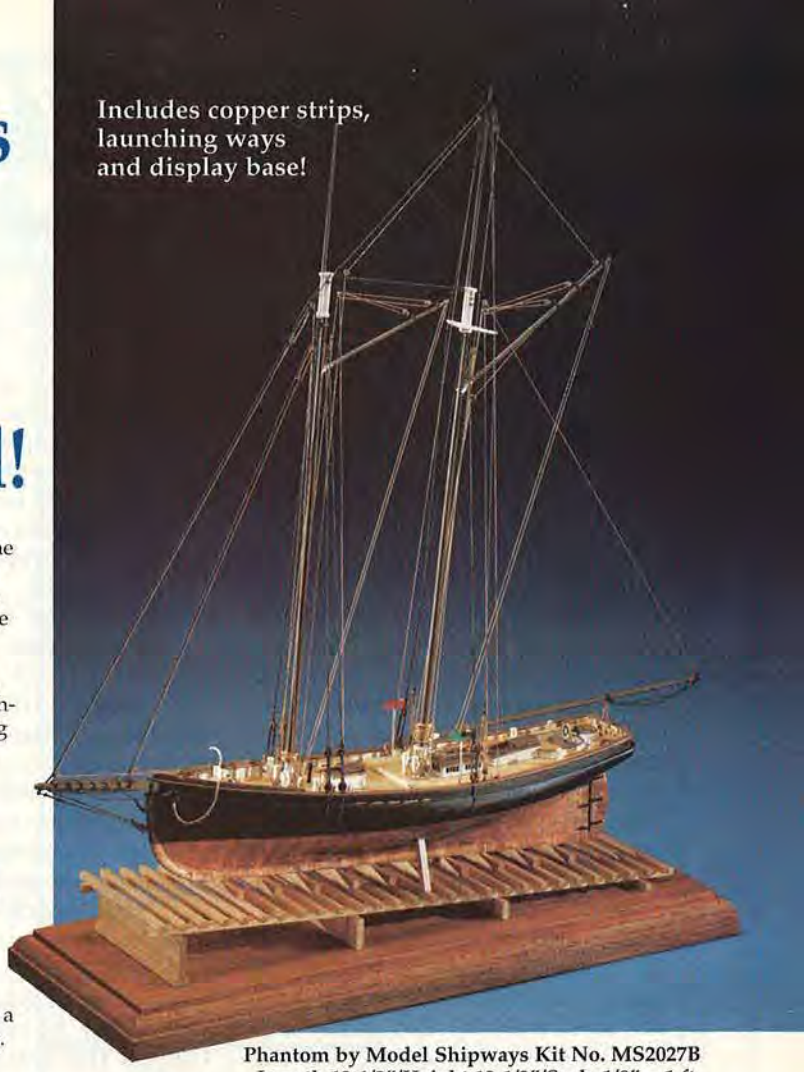

Phantom by Model Shipways Kit No. MS2027B
Length 13-1/2"/Height 13-1/2"/Scale 1/8" = 1 ft.

Even if you've never built a model before, you can experience the pleasure and pride of accomplishment wooden ship modeling offers. You can build the two-masted schooner pictured here–a true-to-scale replica, decked out with gleaming brass fittings, delicate rigging–lifelike in every detail.

It's much easier than you think! Working with precise in-scale plans and fine materials, you'll sand the hull, paint and install deck furnishings. You'll add the helm and bowsprit, and apply the copper plating to the hull. Finally, you'll set the masts and rig the lines–just like a shipwright of a hundred years ago. The result? An authentically detailed, museum quality wooden ship model you'll display with pride... a valuable keepsake to be treasured for generations.

The Secret's In Our Kit

We designed our kit especially for the first time modeler. We include all the materials you need to build the model as shown. The solid basswood hull is pre-carved; all you do is a little shaping and light sanding. You'll get wood parts for the cabin and companionways, ready-to-use wooden blocks and deadeyes, solid brass and finely cast metal fittings and three diameters of rigging line. We even give you copper plating to cover the hull! Hardwood display base and launching ways complete the kit. Three sheets of plans and 16 page step-by-step instruction book show you the way to a magnificent model. (Expect to spend 50 to 75 pleasure-filled hours completing it.)

The Phantom was built for the Port of New York Pilots in 1868. She was lost during the great blizzard of '88, going ashore at Sandy Hook, NJ. Two years earlier, on March 14, 1886, she rescued 852 people from the sinking British liner S.S. Oregon off the Long Island coast. The plans in our kit are a faithful adaptation of the originals.

SPECIAL INTRODUCTORY OFFER WITH FREE BOOK AND CATALOG!

We want to introduce you to this fascinating hobby now! Our regular catalog price for the *Phantom* is $44.99. But for a limited time only, it's yours for just $34.99! And, if you order now, we'll also send you *The Neophyte Shipmodeler's Jackstay*, a richly illustrated 60 page beginner's guide to ship modeling. Selling for $7.99, it's yours–*absolutely free!* You'll also receive a 92 page color catalog showing over 90 ship model kits, hundreds of miniature tools and reference books.

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Includes all the finishing materials you need! 1 oz. bottle of white glue, six 1/2 oz. bottles of Floquil Model Paints (dull black, bulwarks white, bulwarks red, bright oil, glaze and thinner), plus three high quality sable paint brushes.
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Dept. WD46, PO Box 1000, Industrial Park Drive, Mt. Pocono, PA 18344-1000

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SHOP TESTED PRODUCTS THAT PERFORM

Water-based contact cement ends hassles

Solvent-based contact cement suffers from two drawbacks: the odor is overpowering and the stuff never flows out easily. That's why I was pleased to discover water-based Lockweld H_2O Contact Adhesive.

Like solvent-based contact cement, you apply Lockweld to both surfaces, wait until these become tack dry, and then press the pieces together. In my tests, the Lockweld spread easily and evenly. I found I could cover the workpieces in the same amount of time it would take to roll on a coat of paint.

To test the bonding strength, I glued up a few scrap pieces—laminate to particleboard and particleboard to particleboard—and tried to pry them apart. The Lockweld held as firmly as any solvent-based product I've tried.

The Lockweld product costs almost double what you'll pay for solvent-based contact cement. But given the spreadability, minimal odor, and soap-and-water cleanup, I think it's well worth the extra money.

—Tested by Chuck Hedlund

PRODUCT SCORECARD

Lockweld H_2O Contact Adhesive

Performance	★ ★ ★ ★ ★
Price	$42.50 per gallon
Value	★ ★ ★ ☆ ☆

Wilsonart International, 2400 Wilson Place, Temple, TX 76504. Call 800/433-3222.

Try your hand at turning these two new materials

If you're looking for a new challenge in turning, listen up. The catalog company Craft Supplies recently began selling two unusual turning materials—Busy Blocks and Talc—that will broaden your turning horizons.

Produced from flooring off-cuts, Busy Blocks turning squares (at *right* in photo) consist of up to 15 different species of wood including padauk, wenge, red and white oak, Honduras rosewood, and others. Pieces of various thicknesses are laminated and cut into different-sized blocks.

In turning a small square, I found that sharp tools are mandatory since pieces of end grain are exposed on all sides of the block. I stayed with gouges and avoided using my scrapers. After I'd turned the rough shape of my project, I noticed a bit of waviness on the surface of the workpiece—probably due to the irregular pattern of end grain next to face grain. I evened this out easily, however, by power-sanding the block for a few minutes.

The smaller sizes of Busy Blocks offer the best value for the money. A 1½×8×8" piece sells for about $23. The largest size, 3×12×12", goes for about $90. Once finished, these blocks make eye-catching bowls or vases and add a distinctive look to your collection of turnings.

—Tested by Marlen Kemmet

Talc, Craft Supplies' other novel material (at *left* in the photo), turned out to be surprisingly easy to work with. I was expecting some rough turning, as heavy and dense as it felt when I first put it on my lathe, but I found it no more difficult to turn than a piece of softwood.

First, I attached it to my faceplate with 5-minute epoxy. I started turning the shape with a scraper, but switched to a gouge soon afterward for more aggressive material removal. To avoid chatter, I used the slowest speed on my lathe, 330 rpm. After turning the shape with the gouge, I switched to 120-grit and then 320-grit sandpaper. For the final finish, I polished the bowl with a #0000 synthetic steel-wool pad (also known as non-woven pads) and then buffed it with beeswax.

The varied colors and "grain" patterns in the Talc block offer as much visual appeal as highly figured woods. The company sells four types of Talc. Each shows a different range of color and pattern. A small vase like the one shown requires about eight pounds of Talc, and costs run between $2 and $3 per pound.

—Tested by Lee Gatzke

PRODUCT SCORECARD

Busy Blocks	
Performance	★ ★ ★ ☆ ☆
Price	See text
Value	★ ★ ★ ★ ☆
Talc	
Performance	★ ★ ★ ☆ ☆
Price	See text
Value	★ ★ ★ ★ ☆

Craft Supplies, P.O. Box 50300, 1287 E 1120 S., Provo, UT 84605-0300. Call 800/551-8876.

Continued on page 98

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COMBINATION 6" BELT & 9" DISC SANDER
1 HP, 110V, 8 amps, 3450 RPM, all ball bearing motor; overall height: 40"; table tilt: 0° to 50°; table surface: 6-1/2" x 12-3/4"; two position work table for disc or belt use; disc speed: 1720 RPM; belt: 6" W x 48" L; belt speed: 1280 FPM; wt: 121 lbs.

ITEM 06852-5VRA
LIMIT 1 **$149.99**

CHICAGO Electric Power Tools INDUSTRIAL

4-1/2" ANGLE GRINDER
- Includes 4-1/2" x 3/16" depressed center wheel and 3-position side handle
- 12"L x 2-7/8"W
- 120V, 5.5 amps, 10,000 RPM
- 8 foot power cord
- 5/8"-11 spindle with 7/8" arbor adapter

ITEM 31135-1VRA **$27.95**

4-1/2" x 1/4" METAL GRINDING WHEELS
- Aluminum oxide
- 24 grit, 7/8" arbor

PACK OF 10
ITEM 06674-4VRA **$6.99**

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2 HP MOTOR

PRECISION 10" BENCH TOP CUTTING SYSTEM
Get big saw capacity and performance from a bench top. Adjustable sliding miter provides smooth control for pin-point accuracy. Advanced rip fence design assures perfect alignment.

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- 1/4" shanks

Includes: 1-1/4" rabbeting*, 1-3/8" cove*, 1-1/16" roman ogee*, 1-1/4" rounding over*, 1/2" flush trimming*, 1-3/16" 45° chamfer*, 1/2" dovetail, 3/4" straight, 1/2" straight, 3/8" V-groove, 1/4" combination panel, 1/4" straight, 1/2" mortising, 1/4" self-piloting flush trim, 3/16" self-piloting 7° bevel trim
*Includes pilot bearing

ITEM 31164-9VRA **$39.99**

CANVAS TOOL BAG
Handy 15" size. Made with heavy duty canvas and hard bottom. Features heavy duty zippered top with two internal pockets and one external pocket with a snap down flap.
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ITEM 32282-1VRA **$5.99**

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Stanley 33-430
LIMIT 1

POWERLOCK® TAPE MEASURE
- 25 foot, 1" blade remains rigid for 7 feet
- Yellow Mylar® coated steel blade with Tru-zero hook

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Work in a dust-free atmosphere with this quality dust collector. It develops over ten times the suction of most shop vacuums. Heavy duty ball bearing castors. Hose sold separately.
3/4 HP; 110V; 5.26 amp;
1 hose inlet; 550 CFM;
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ITEM 30867-6VRA **$139.99**

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2 PC. 3/4" HEAVY DUTY PIPE CLAMP SET
Pipe not included.
- Handle screw operating range: 2-1/8"

Pittsburgh LIFETIME WARRANTY

ITEM 31255-5VRA **$2.93**

12-1/2" ROLLER AND BRACKET SET
Double your table saw capacity! Make your own roller table.

ITEM 30026-6VRA **$4.49**

CHICAGO Electric Power Tools

13.2V 3/8" CORDLESS DRILL KIT WITH KEYLESS CHUCK
- Indicator on drill body notifies operator of low battery charge
- Includes 6 pc. drill bit set, 6 pc. screwdriver bit set, magnetic extension bit, charger, battery, and keyless chuck
- Variable speed, reversible; 0 to 600 RPM
- 6 torque settings: 13, 18, 25, 30, 33, & 80 in. lbs.

ITEM 33165-4VRA **$49.95**

13.2V BATTERY
ITEM 33214-4VRA **$25.99**

CENTRAL MACHINERY

1/3 HP MOTOR

5 SPEED BENCH DRILL PRESS
- 620 to 3100 RPM
- 2" stroke, 8-1/4" swing
- 8-1/4" max. distance spindle to table
- 22-1/2" high, 47 lbs.

ITEM 05901-7VRA **$49.95**

29 PC. HIGH SPEED STEEL DRILL BIT SET
- 1/16" thru 1/2" by 64ths
- M-2 high speed steel
- Jobber length, straight shank
- Includes metal index

ITEM 00986-1VRA **$8.99**

CENTRAL MACHINERY

10", 2HP BENCH TABLE SAW
- Maximum depth of cut @ 90°: 3"; @ 45°: 2-1/2"
- Motor: 2 HP, 115V, 60 Hz, 13 amp, 4500 RPM
- Shipping weight: 40 lbs.
- Blade sold separately

ITEM 32648-3VRA **$79.99**

10" SAW BLADE
- 40 tooth carbide tips
- 5/8" arbor

ITEM 00529-3VRA **$8.99**

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- Maximum depth of cut: 3/8"

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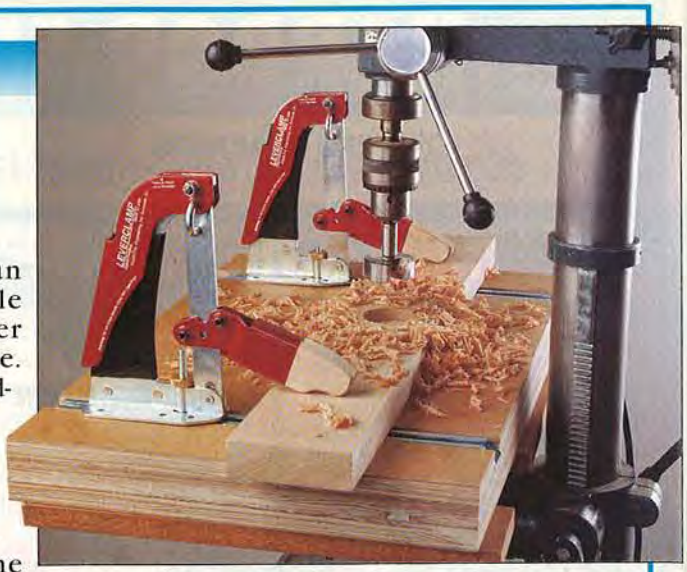
Continued from page 96

Quick-action adjustable clamps hold with 300 pounds of pressure



Clamping a workpiece to a drill-press table can prove difficult and awkward. But lose control of a workpiece just once, and you'll realize how much you need to clamp any workpiece you put on a drill press.

The MapleTek Leverclamp has everything I could ask of a drill-press clamp. It gives you 300 pounds of holding pressure, 4" of height capacity, and single-handed lever operation. When you mount it in the company's T-slot channel called Clamptrax, you can move the Leverclamp on and off the table in seconds.

The clamps are made of solid steel except for the maple tips which prevent marring of the workpiece. If you need more padding, you can replace the maple tips with a softer wood such as pine. To adjust the holding pressure, you turn an allen screw at the top of the clamp.

There's no reason to restrict the use of these clamps to your drill press, however. You can bolt the clamps directly to your bench if you want a fixed-position clamp. If you change clamping setups frequently, I'd recommend the Clamptrax T-slot system to get the most convenience and speed out of this well-designed system.

—Tested by Bob McFarlin

PRODUCT SCORECARD

MapleTek Leverclamp

Performance	★ ★ ★ ★ ★
Price	$44.95 ppd. per clamp, $13 for a 16" piece of Clamptrax
Value	★ ★ ★ ★ ☆

MapleTek Engineering, 1016 Morse Avenue, #5, Sunnyvale, CA 94089. Call 800/425-2677.

	Total Shop 90177	JDS AirTech 2000	Hartville Tool	Penn State 460
Years of Experience	9	1 1/2	1	2
Filter Size (Sq Ft)	26	14	15	20
Filter Depth (Inches)	18	12	8	18
Filter Efficiency	95%	65%	?	45%
Filter Life (Approx Months)	12	8	6	12
Filter Cost	$29	$35	$36	$35
Air Tight Fan Box	Yes	No	No	No
UL Approved Filter Unit	Yes	No	No	No
18 Ga. Welded Construction	Yes	No	No	No
Air Direction Tube	Yes	Yes	No	No
Weight	60	43	30	40
Unit Size	12x24x37	12x24x28	12x24x20	12x24x30
Lifetime Warranty	Yes	No	No	No
Money Back Guarantee	Yes	No	No	No

*All figures are from company personnel or company literature.

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DELTA TOOLS

Model	Description	List	Sale
23-700	Wet/Dry Grinder	234	155
23-710	New Sharpening Center	210	165
23-680	6" Bench Grinder 1/4 HP	86	69
11-950	8" Drill Press	199	128
31-050	1" Belt sander 2.0 amp	104	75
31-460	4" Belt/Disc Sander	198	129
40-560	16" 2 speed Scroll Saw	266	169
40-530	NEW 16" Scroll Saw	153	115
11-990	12" Bench Drill Press	276	184
11-090	32" Radial Bench Drill Press	399	305
43-505	1/2" Bench Router/Shaper	399	295
22-540	12" Bench Top Planer	Sale	385
	FREE Set of extra knives included !		
36-220	10" Compound Mitre Saw	350	215
28-180	Bench Band Saw	232	158
28-190	NEW 12" Band Saw	465	395
40-640	20" Bench Scroll Saw	466	295
37-070	NEW 6" w/spd Bench Jointer	337	258
14-650	Hollow Chisel Mortiser	668	285
46-700	12" Wood Lathe	548	449
33-990	10" Radial Arm Saw	818	695
37-280	6" Motorized Jointer	488	389
33-055	8-1/4" Sawbuck comp w/legs	865	629
36-040	8-1/4" Compound Mitre Saw	224	149
36-905	30" Unifence	385	249
36-906	50" Delta Unifence	525	305
36-755	10" Tilting Arbor Saw	1264	1039
17-900	16-1/2" Floor Drill Press	462	415
33-060	"Sidekick" Miter Saw	510	389
37-190	6" Deluxe Jointer	554	479
36-275	8-1/4" Builders Saw	444	265
36-210	10" Compound Mitre Saw	438	255
36-070	10" Mitre Saw	284	165
34-555	Sliding Table	459	289
22-661	13" Planer w/ stand 2 HP	1513	1239
22-675	NEW DC380 15" Planer	1439	1275
37-154	6" Jointer w/ mobile base	1451	1239
34-444	Contractors Table Saw	812	659
34-445	34-444 Saw w/30" Unifence	1200	829
	above saw comes w/ mobile base		
28-283	14" Band Saw w/enc. stand	910	779
	above saw comes w/ mobile base & fence		
36-250	NEW 10" Slide Compound Saw	825	469
36-230	NEW 12" Compound Mitre Saw	480	359

MILWAUKEE TOOLS

6527	NEW Sawzall with case	320	178
6528	above Sawzall w/wired cord	316	178
0408-6	12V Drill w/kyls chuck & 2 batt		172
0406-1	9.6V Drill Kit with 2 batteries	332	159
0224-1	3/8" Drill 4.5 amp magnum	227	128
0234-1	1/2" Drill 4.5A mag 0-850 rpm	237	139
0235-1	1/2" Drill w/keyless chuck	237	139
0244-1	1/2" Drill 4.5A mag 0-600 rpm	237	139
0222-1	3/8" Drill 3.5 amp 0-1000 rpm	198	119
0228-1	3/8" Drill 3.5 amp 0-1000 rpm	195	115
0375-1	3/8" close quarter Drill	237	139
0379-1	1/2" close quarter Drill	268	158
6546-1	cdls Screwdvr 200 & 400 rpm	141	84
6547-1	6546-1 w/bits, 1/4" chuck, & cse	176	105
5399	1/2" D-hdle Hammer Drill Kit	332	194
6507	Original SawZall with case	264	152
5397-1	3.8" var. spd Hammer Drill Kit	255	145
5371-1	1/2" var. spd Hammer Drill Kit	340	188
3107-1	1/2" w/spd right angle Drill Kit.	399	228
6754-1	Drywall Gun 0-4000 5.4 amp	196	114
3300-1	1/2" var. spd right angle Drill	356	214
5680	Router 2 HP w/ 1/4" & 1/2" collets	362	165
6142	4-1/2" Grinder w/cse & access.	208	125
6749-1	Drywall Gun 0-2500 5.4 amp	218	132
6365	7-1/4" Circular Saw 13 amp	218	125
6368	6365 w/fence,carb. blde,& cse	249	142
6377	7-1/4" Worm Drive Saw	330	189
6256	Top Handle Jig Saw	264	158
6490	10" Mitre Saw	444	259
6491	6490 w/ carbide blade & bag	532	325
6494	10" Compound Mitre Saw	444	319
0422-1	NEW 12V Hammer Drill w/2 batt	430	249
0431-1	NEW 12V Drill w/ 2 batteries	385	229
6256	NEW Top Handle Jig Saw	315	185

FREUD CARBIDE TIPPED SAW BLADES
5/8" Bore - Industrial Grade

Item	Description	Teeth	List	Sale
LU72M010	Gen Pur. A.T.B.	10° 40	69	42
LU82M010	Cut-off	10° 60	93	45
LU84M011	Comb	10° 50	78	42
LU85M010	Super Cut-off	10° 80	115	59
LM72M010	Ripping	10° 24	69	38
LU73M010	Cut off	10° 60	84	45
LU87M010	Thin Kerf	10° 24	72	42
LU86M010	Thin Kerf	10° 60	88	45
LU98M010	Ultimate	10° 80	128	68
LU91M010	Compnd Mitre	10° 60	88	54
F410	NEW Quiet Blade	10° 40	95	49
F810	NEW Quiet Blade	10° 80	135	74
TK303	7-1/4" Finishing	40	38	25
TK906	10" Combo	50	53	32
SD308	6" Dado - Carbide		230	119
SD506	6" carbide w/case & shims		292	155
SD508	8" carbide w/case & shims		344	168
F10	2-1/8" x 3/4" Biscuit 1000 Qty		43	29
F20	2-3/4" x 1" Biscuit 1000 Qty		45	29
FA	Assorted Biscuits 1000 Qty		45	29
FB100	16 piece Forstner Bit Set		338	189
94-100	5 pc. Router Bit Door System		320	159
TR215	10" Slide Cmpd Mitre Saw		688	369

The following tool has a $20.00 rebate thru 3/31/96

FT2000E	3-1/4 HP w/sp Plunge Router	410	209

The following tools have a $30.00 rebate thru 3/31/96

JS100	Biscuit Jointer w/ case	334	168
JS102	Biscuit Jointer w/fence & case	355	179

MAKITA TOOLS

Model	Description	List	Sale
6172DWE	3/8" v/spd Drill Kit w/ 2 batt	220	109
5090DW	3-3/8" Saw Kit 9.6 volt	270	148
ML900	Incandescent Flashlight 9.6V	Sale	37
DA391DW	3/8" angle Drill Kit 9.6 volt	312	179
6095DWE	9.6 volt Drill Kit w/2 batteries	270	139
6095D	6095DW Drill only & case	Special	79
632007-4	9.6 volt Battery	47	30
632002-4	7.2 volt Battery	39	28

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6202DWG	9.6V 3/8" Drill Kit w/ LED batt	390	219
6212DWG	12V 3/8" Drill Kit w/ LED batt.	412	228
6312DWG	12V 1/2" Drill Kit w/ LED batt.	432	239
6201DWHE	9.6V 3/8" Drill Kit w/ 2 batt	351	175
6211DWHE	12V 3/8" Drill Kit w/ 2 batt	368	185
6311DWHE	12V 1/2" Drill Kit w/ 2 batt	399	205

6073DW 7.2V cdls Drill Kit. Variable speed & clutch. Complete with battery, charger, & case. ..... **Super Sale** 99

6012HDWE 9.6V cdls Drill Kit. 2 speed & clutch. Complete with 2 batteries, charger, & case. ..... **Super Sale** 119

5007NBA	7-1/4" Saw w/electric brake	263	138
9900B	3" x 21" Belt Sander w/bag	344	179
9924DB	3" x 24" Belt Sander w/bag	329	189
4301BV	Orb. var. spd Jig Saw 3.5A	292	155
JR3000V	var. speed Recip Saw w/case	252	139
9820-2	Blade Sharpener	394	215
N1900B	3-1/4" Planer with case	244	134
N9514B	4" Disc Grinder 4.6 amp	111	65
B04552	1/4 sheet Pad Sander w/bag	98	55
DA3000R	3/8" Angle Drill	314	185
2708W	8-1/4" Table Saw	585	309
2711	10" Table Saw with brake	1067	599
6405	3/8" Drill Rev. 0-2100 rpm	112	68
6510LVR	3/8" Drill Rev. 0-1050 rpm	168	98
6013BR	1/2" Drill Rev. 6 amp	280	149
9401	4" x 24" Belt Sander w/bag	378	239
5007NB	7-1/4" Circular Saw 13 amp	232	124
5007NBK	5007NB Saw w/ plastic case	Sale	129
LS1011	10" Slide Compound Saw	946	525
LS1211	New 12" Slide Cmpd Saw	1550	795
3901	New Plate Joiner Kit	372	209

SENCO AIR NAILERS

SFN1+	Finishing Nailer 1" - 2" w/ case	448	335
SN325	Nailer 1-7/8" - 3-1/4"	665	419
SLP20	New Pinner w/cse 5/8 -1-5/8"	399	278
SKS	Stapler 5/8" - 1-1/2"	390	275
SN70	Fram. Nailer Clip Hd 2"-3-1/2"	690	459
SN60	Fram. Nailer-Full Hd 2"-3-1/2"	638	449
SN65	15% more power than SN60	709	479
SFN40	NEW Finish Nailer 1-1/4 - 2-1/2	571	389

BOSTITCH AIR NAILERS

N80S-1	Stick Nailer	Super Sale	355
RN45	Coil Roof Nailer 3/4 - 1-3/4	845	395
N60FN-2	Finishing Nailer	650	335
BT35-2	Brad Tacker 5/8" - 1-3/8"	275	159
BT35-2K	BT35-2 w/ case, oil, & brads	299	169
CWC100	1 HP Pancake Compressor	463	289
MIIIFS	Flooring Stapler 15 gauge	931	529
S32SX-1	Finish Stapler - 1/2" - 1-3/8"	275	159
S32SX-1K	S32SX-2 with case & oil	269	169

SKIL TOOLS

2735-04	12 volt cordless Drill Kit	249	144
2736-04	2735-04 with keyless chuck	269	148
3400	10" Table Saw - Bench Top	270	189
77	Famous 7-1/4" Worm Drive Saw	Sale	144
77M	NEW 77 Mag Worm Saw - 2 lbs lighter than Model 77	Sale	159

PANASONIC CORDLESS

EY6205EQK	12V Drill, w/ 15 minute charger, Ironman battery, & case	368	195

NEW PREDATOR DRILLS

EY6181CRKW	9.6V Drill Kit w/ 2 batteries, 1 hour charger, & case	305	165
EY6181EQK	9.6 volt Drill with 15 min. charger, case & Ironman battery	315	169
EY6100CRKW	12 volt Drill Kit with 2 batteries, 1 hour charger, & case	358	188
EY6100CQKW	Same as EY6100CRKW but has 15 minute charger	420	199
EY6100EQKW	12 volt Drill kit with 2 Ironman batteries, 15 min. charger, & case	375	199
EY6101SQK	12 volt 1/2" Drill w/ 15 min. charger, diagnostic battery, & case	420	249

PASLODE IMPULSE GUNS

IM250	Trimpulse Finish Nailer Kit	849	548
IM325	Impulse Framing Nailer Kit	849	548

WAGNER PAINT & SPRAYER PRODUCTS

375E	Airless System	195	164
505	High performance Airless Painter	440	369
HVLP	Fine coat finishing HVLP System	195	159
CS2000P	ro fine finish HVLP System	339	278

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Airy Air Nailers

0241SK
Brad Nailer 3/8"-1 9/16"
Same as Senco SLP-20
List 180 Sale 98

0250SK
Brad Nailer 3/4"-2"
List 296 Sale 164

0626SK
1/4" Crown Stapler 3/8"- 1"
List 194 Sale 104

0635SK
1/4" Crown Stapler 1/2"-1-3/8"
Same as Senco SKS
List 310 Sale 175

EZ-1
New Multi-purpose nailer & stapler
List 180 Sale 98

Above Nailers come w/case, fasteners, oil & wrenches

0565T
Angle Finish Nailer 1"-2-1/2"
List 386 Sale 205

DELTA
#34-080
10" MITRE BOX
XTRA SPECIAL
194.00

DEWALT TOOLS

Model	Description	List	Sale
DW364	7-1/4" Circ. Saw w/brake	285	158
DW945K-2	12V cdls Drill Kit w/2 batt	309	185
DW610	1-1/2 HP 2 handle Router	274	149
DW411	1/4 sheet Palm Sander	97	58
DW100	3/8" Drill, 4 amp,0-2500 rpm	118	68
DW682K	Biscuit Joiner with case	429	219
DW705	12" Compound Mitre Saw	706	359
DW625	3 HP var. spd PlungeRouter	Sale	275
	DW625 Router comes with FREE DW6966 Fine Depth Adjuster!		
DW675K	3-1/8" Planer with case	289	164
DW431	3 x 21 v/spd Belt Sander	331	184
DW421	5" Palm Random Orbit Sander	125	74
DW444	6" Ran Orb Sander-PSA pad	266	139
DW443	DW444 w/hook & loop pad	266	139
DW673K	NEW Laminate Trimmer Kit	364	215
DW930K	NEW 12V 5-3/8" Trim Saw Kit	370	199
DW935K	NEW 14.4V 5-3/8" Trim Saw Kit	444	237
	DW935K comes with two batteries!		

DEWALT CORDLESS DRILLS

DW952K	3/8" v/spd w/two 9.6V batt	280	145
DW962K-2	3/8"v/spd w/two 9.6V XR batt.	324	179
DW972K-2	3/8"v/spd w/two 12V XR batt.	352	189
DW904	12 volt flashlight		29.95
	DW972K-2 drill & DW904 flashlight	Sale	205
DW991K	3/8"v/sp w/one 14.4V XRbatt	370	199
DW991K-2	above drill w/ 2 batteries	Sale	225
DW944KQ	1/2" v/spd w/1 14.4V XR batt	450	235
DW944KQ-2	Above drill w/ 2 batteries	Sale	259
	Above drill kits come w/ charger & steel case!		
DW991KS-2	DW991K drill, DW935 trim saw, & case	Sale	339

HITACHI TOOLS

C8FB	8-1/2" Slide Compound Saw	1400	489
C10FC	10" Mitre Saw	432	249
C10FS	10" Slide Compound Saw	1595	745
P12R	12-9/32" Planer	1470	795
P12RA	Planer/Joiner	1940	995
G12SA	4-1/2" Grinder 6.9 amp	160	79
NR83A	Fram Nailer 2 - 3-1/2 Full Head	700	409
NR83AA	Framing Nailer 2 - 3-1/2	750	425
NT65A	16 ga. Brad Nailer 1 - 2-1/2	610	345
NV45AB	Coil Roofing Nailer 7/8 - 1-3/4	750	425
DN10DYK	9.6V right angle Drill Kit	350	189

BIESEMEYER FENCES

B-50	50" Commer. Saw Fence	345	298
T-SQUARE 52	52" Homeshop Fence	279	238
T-SQUARE 40	40" Homeshop Fence	259	208
T-SQUARE 28	28" Homeshop Fence	249	198

JORGENSEN ADJUSTABLE HANDSCREWS

Item#	Jaw Length	Open Cap	List	Sale	Box of 6
#0	8"	4-1/2"	20.35	12.10	66.95
#1	10"	6"	23.30	12.90	71.95
#2	12"	8-1/2"	26.75	14.90	83.95

PONY CLAMP FIXTURES

Model	List	Sale	Lots of 12
50 3/4" Black Pipe Clamps	15.45	8.10	92.50
52 1/2" Black Pipe Clamps	12.90	6.95	74.95

BOSCH

Model	Description	List	Sale
1587VS	NEW Top Hand "CLIC" Jig Saw	292	149
1584VS	NEW Barrel "CLIC" Jig Saw	285	149
Bosch Metal Case for above Jig Saws		34	32
Bosch 30 blade assortment for Jig Saws			28.99
	1584VS or 1587VS with steel case and 30 Bosch blades	Sale	189
3270DVS	3" x 21" v/spd belt sander	270	165
1276D	NEW 4" x 24" Belt Sander	379	219
1275DVS	NEW 3" x 24" v/spd Belt Sndr.	379	219
1276DVS	NEW 4" x 24" v/spd Belt Sndr.	408	229
1347AK	4-1/2" Grinder w/cs & access,	185	105
1194VSR	1/2" var. speed Hammer Drill	282	155
1194VSRK	above Hammer Drill w/case	313	169
1609K	Lam Installers Kit with 1609	343	189
1609KX	Deluxe Installers kit	405	234
1604A	1-3/4 HP 2 Handle Router	250	142
1604AK	same as above w/cse & acc	318	185
1606A	1-3/4 HP D-handle Router	295	179
1613EVS	2HP v/spd Plunge Router	359	199
1615EVS	3 HP v/spd Plunge Router	505	289
1634VSK	NEW Recip Saw 10.5 amp	225	159
3054VSRK	12V Drill Kit w/ 2 batteries	330	185
3300K	NEW 12V Drill Kit w/ 2 batt	348	189
3310K	NEW 12V T-handle Drill Kit	348	189
3110K	NEW 9.6V T-handle Drill Kit	320	185
3107DVS	NEW 5" Random Orbit Sander	165	98
3107DVSK	3107DVS with case	195	115
3725DVS	NEW 5" Random Orbit Sander	258	149
3727DVS	NEW 6" Random Orbit Sander	268	154
B3915	NEW 10" Slide Compound Saw	1025	619
B1650K	Biscuit Joiner	289	159
B7000	Corner Detail Sander	122	68
B7001	B7000 w/ variable speed	Sale	89.95
B4050	In Line Jig Saw	199	115
11230EVS	SDS-max 1-1/2" Rtry Hmr	885	525
11231EVS	SDS-max 1-3/4" Rotary Hmr	1936	809
11223EVS	NEW SDS-max 2" Rotary Hmr	1548	929
11224VSR	7/8" SDS Rotary Drill	495	229

AEG POWER TOOLS

Model	Description	List	Sale
TXE150	6" var/spd Ran Orb Sander	304	142
HBSE75S	3"x21" var/spd Belt Sander	309	182
BSPE100X	Top Handle Jig Saw w/case	286	164
FSPE100X	Barrel Grip Jig Saw w/case	274	164

PORTA NAILER

401	Porta Nailer complete	265	205
501	Face Nailer complete	265	205

BLACK & DECKER

2694	7-1/4" Super Sawcat w/case	285	158
2695	8-1/4" Super Sawcat w/case	328	179

DAVID WHITE

LP6-20	Sight Level package - 20x	310	205
LP6-20XL	LP6-20 w/9056 tripod & 7620 rod		265
LT8-300	Level Transit - 26x	695	479
LT8-300P	above Level w/optical plum	821	559
LT6-900	Level Transit - 20x	389	269
ALT6-900	Automatic Level - Transit -18x	638	429
ALTP6-900	above Level w/tripod & rod.	708	495
ALP6-18HD	above Level w/tripod & rod	570	385
LL100	NEW Finish Line Laser Level	210	135

RYOBI SPECIALS

RE600	3 HP Plunge Router	500	228
BE321	3" x 21" var. spd Belt Sander	310	148
BT3000	10" Table Saw with stand	1125	529
AP12	12" Bench Planer	864	395
OSS450	Oscillating Spindle Sander	340	159
DC500	Detail Carver	120	64
HT20VSK	NEW Multi Tool	115	59
CD125K	NEW 12V cdlss Drill w/ 2 batt.	175	109

SIOUX TOOLS

8030	3/8" var/spd Drill	250	145
8000	3/8" var/spd close qtr Drill	201	125
690	5" Air Random Orbit Sander	139	132
Msx636 FEIN	Triangle Sander Kit	Sale	199
Msxe6362NEW	Triangle Sander w/spd	Sale	229
Msx625 FEIN	New Air Triangle Sander	Sale	189
LPN672 PONY	Air Palm Nailer w/glove	Sale	94.99
RTM01 ROTOZIP	Drywall cut out unit		68.95

QUAL-CRAFT PRODUCTS

2200	Pump Jack	79	58
2201	Pump Jack Brace	30	20
2203	Pump Jack guard rail holder	31	21
2204	Workbench & rail holder combo	53	39
	Buy any 6 (can be assort.) deduct 10%		
2601	Wall Jack	167	108
	Lots of 4 deduct additional 10%		

PORTER CABLE

9444	New Profile Sander Kit	205	119
7499	Ultimate Cut-out tool	113	69
690	1-1/2 HP Router 8 amp	260	142
691	1-1/2 HP Router D-handle	285	158
693	1-1/2 HP Plunge Router Base	320	178
6931	Plunge Router Base	125	79
695	1-1/2 HP Router/Shaper	400	229
696	Heavy Duty Shaper Table	230	135
351	3" x 21" Belt Sander w/o bag.	280	159
352	3" x 21" Belt Sander with bag	290	165
352VS	3x21 Belt Sander w/bag v/spd	305	169
360	3" x 24" Belt Sander with bag	365	198
361	3" x 24" Belt Sander w/o bag.	345	194
362	4" x 24" Belt Sander with bag	380	205
97751	1/2" v/spd Hammer Drill w/cse	270	158
9118	Porta Plane Kit 7 amp	390	225
505	1/2 sheet Pad Sander	230	128
7549	Top handle Jig Saw 4.8 amp	270	134
330	Speed Block Sander 1/4 sheet	110	62
556	Biscuit joiner w/5556 tilt fence	Sale	139
345	6" Saw Boss 9 amp	190	109
9345	345 comp. w/cse & carb blde	220	128
9647	TIGER CUB Recip. Saw	210	124
9637	Full var/spd Recip Saw 8 amp	270	148
7519	3-1/4 HP Router 2 Handle	445	244
7518	3-1/4 HP 5 speed Router	510	275
7539	3-1/4HP v/spd Plunge Router.	510	269
7399	5.6 amp Drywall Cutout Unit	140	84
7310	5.6 amp Laminate Trimmer	165	98
97310	Laminate Trimmer Kit comp	360	198
7335	5" Rndm Orbit Sndr w/ case	245	135
97355	7335 w/ case & dust pick-up	274	138
7336	6" Rndm Orbit Sander w/ case	250	139
97366	7336 w/ case & dust pick-up	284	144
73333	Dust Collection system	31	24.50
9853K	12V 3/8" Drill Kit w/ 2 batt	280	164
9855	12V 1/2" 2 spd,v/sp Drill Kit	335	178
8500	12V battery for above drills	Sale	45
332	Palm Grip Rndm Orbit Sander	120	74
333	above Sander with dust bag	135	79
334	333 Sander with PSA pad	135	79
550	Pocket cutter with case	330	185
7700	10" "Lazerloc" Mitre Saw	634	345
310	Production Laminate Trimmer	250	145
347	7-1/4" "Framers" Circ Saw	225	129
347K	347 Saw w/ plastic case	250	134
743	347 Saw - left hand version	225	129
743K	743 Saw w/ plastic case	250	134
9743	743 Saw with case	255	139
447	347 Saw with brake	225	134
843	447 Saw-left hand version	245	139
7800	Drywall Sander	585	329
7810	Wet/Dry Vac for above sander	455	259
9737	New Tiger Recipro Saw	290	165

New Porter Cable Pneumatic Nailers

BN125	Brad Nailer -18 ga. 5/8"-1/4"	144	99
BN200	Brad Nailer -18 ga. 3/4"-2"	238	145
FN200	Finish Nailer -16 ga. 3/8"-2"	270	165
FN250	Finish Nailer -16 ga. 1"-2-1/2"	362	225
DA250	Angle Nailer -15 ga. 1-1/4"-1-1/2"	412	249

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FINISHING TOUCHES

A wee canoe that's a classic, too!

After years of home building, remodeling, and custom cabinetmaking, Canadian Paul Smithers decided to turn his skills to boatbuilding. "I had a 1,100 square-foot shop set up for cabinets, but the market was drying up," he says. "I grew up around boats, so I finally decided to build one to see what it was like."

That was over three years ago. Now operating as Marsh Muckers Boatworks in Ashton, Ontario, Paul skillfully turns out mahogany kayaks, small rowing tenders, car-top boats, and cedar-strip canoes trimmed with exotic woods. His unique "Peeper" canoe, shown *right*, was designed for those who struggle to portage a larger, heavier craft. At 30 pounds, it holds two people.

Paul's wife, Jean, brought his work to our attention after reading the article "Classic Canoe Craftsmanship" in the September 1995 issue of *WOOD®* magazine. "Your readers north of the border might like to know about a Canadian craftsman who builds classics, too," she advised. Thanks, Jean!

Canadian woodworker Paul Smithers easily lifts overhead his 10', 30-pound "Peeper" canoe made of cedar strips.

For more information on Paul's boats, write (with an enclosed SASE, please) to: Marsh Muckers Boatworks, R.R. #3, Ashton, Ontario, Canada K0A 1B0.

Lightning can be choosey

"Beware the oak, it draws the stroke," was but one of many adages in English folklore describing lightning's dazzling preference for striking certain types of tree. Another one was, "Avoid the ash, it courts the flash." So over the years, a number of studies have attempted to authenticate these old sayings. Here are just some of the studies' documented findings:

- America, 1898: oak, 48 strikes; pine, 33; spruce, 5; beech, 1.
- Germany, 1920: oak, 56 strikes; ash, 20; pine, 4; beech, 0.
- England, 1935: oak, 61; elm, 32; ash, 26; poplar, 13.

One conclusion experts have drawn from this information is that lightning tends to hit rough-barked trees, such as oak, elm, or ash, rather than smooth-barked ones, such as beech, birch, or maple. Our honest advice: Don't stand under any tree, no matter the species, during stormy weather.

Illustration: Jim Stevenson

Shrine to the hand-hewn

Amid the pines that shroud western Michigan's Pere Marquette River near Baldwin stands a monument to one man's craftsmanship. The Shrine of the Pines, a Lake County park, showcases the amazing woodworking skill of a hunting/fishing guide and woodsman who created with only his hands and crude tools.

Raymond Overholzer walked the Michigan woods in the 1920s. He retrieved from them remains of the logging era—a rooted stump, a twisted branch, a forgotten log. His stock was always found wood. "Ray never cut down a tree," the museum guides will tell you. "He just used leftovers."

From those scraps of a once-great pine forest Overholzer fashioned a rocking chair of roots so perfectly balanced that it rocks 55 times with a single push; a table made from a 700-pound stump, with inlays; a 12-gun rack that turns on 39 wooden roller bearings, and more. And he did all this (over a period of 30 years) without power tools, nails, screws, or even sandpaper!

The country craftsman skillfully fitted the joints of his projects and glued them, smoothed the wood with crushed glass glued to old conveyer belting from a nearby sawmill, then finished them by polishing with raw deer hide. By 1940 he had accumulated so many handcrafted pieces that he built a huge lodge to house them. That's where you'll find his work today, because prior to his death in 1952, Overholzer had turned the lodge into a museum. You can visit it from 10 a.m. to 6 p.m., May 15 through October 15. For more information, call 616/745-7892.

A fireplace made from 70 tons of native stone commands the living room in the Shrine of the Pines near Baldwin, Michigan. The handcrafted furniture was made from white pine roots and branches.

Photographs: Jean Smithers; Kurt P. Kahl

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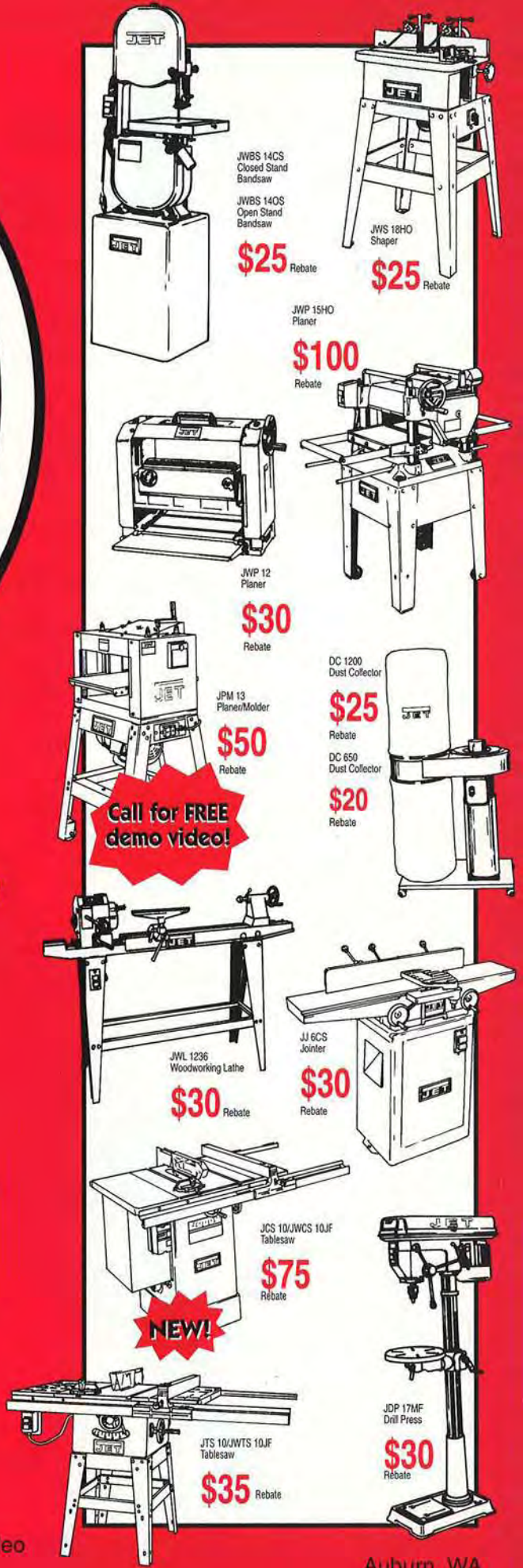
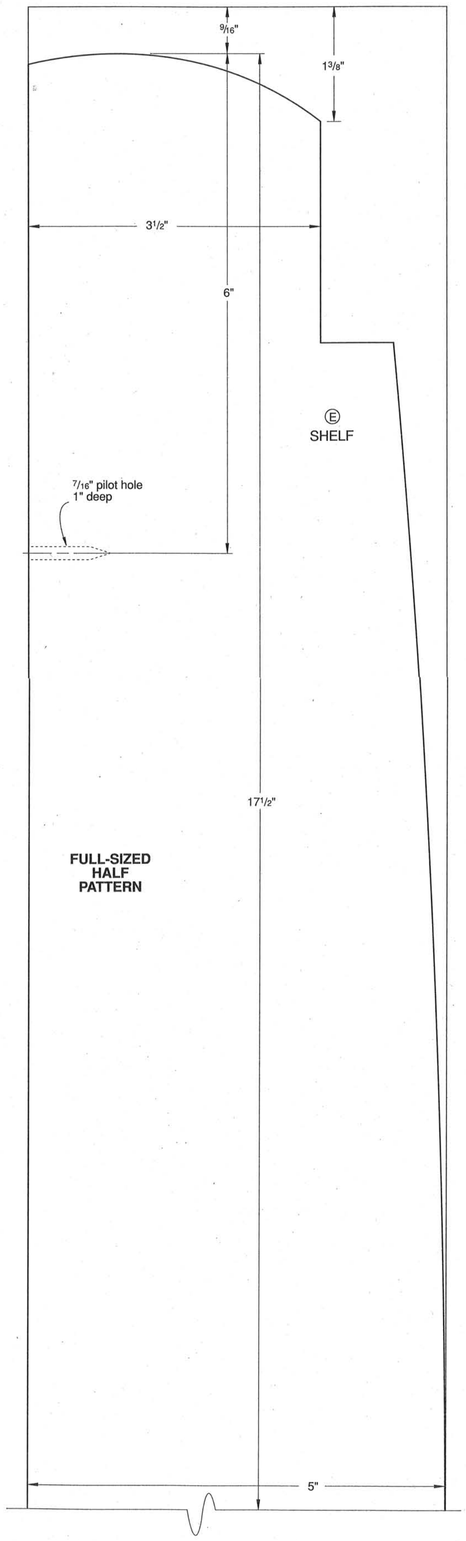
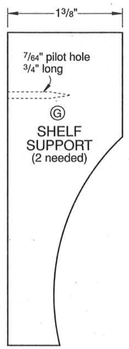
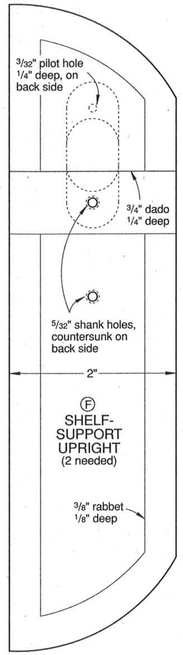


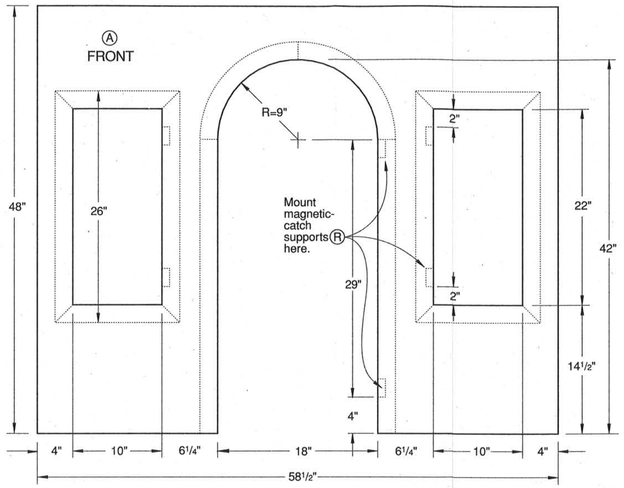
Auburn, WA

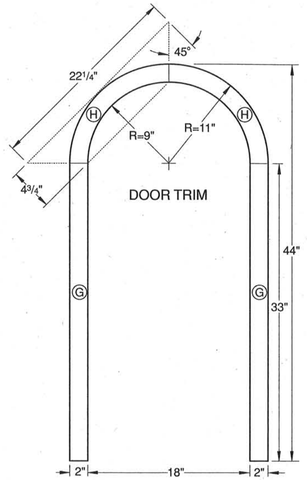


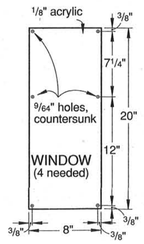


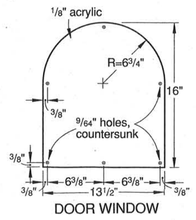


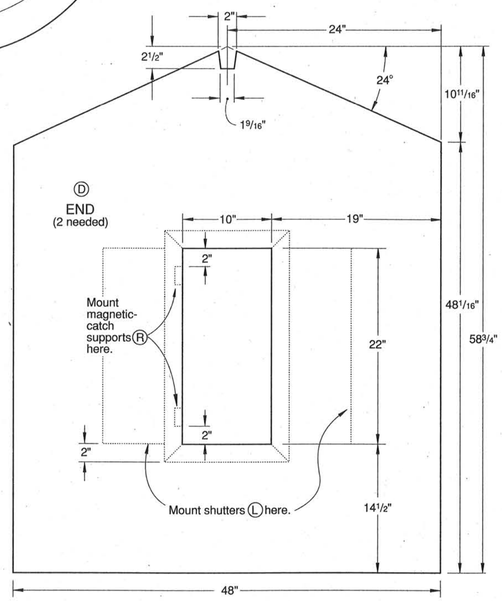
The back Ⓐ is the same size as the front. The back Ⓐ has no cutouts for the windows and door.

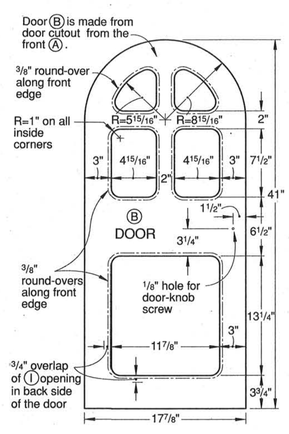


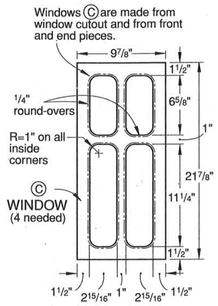


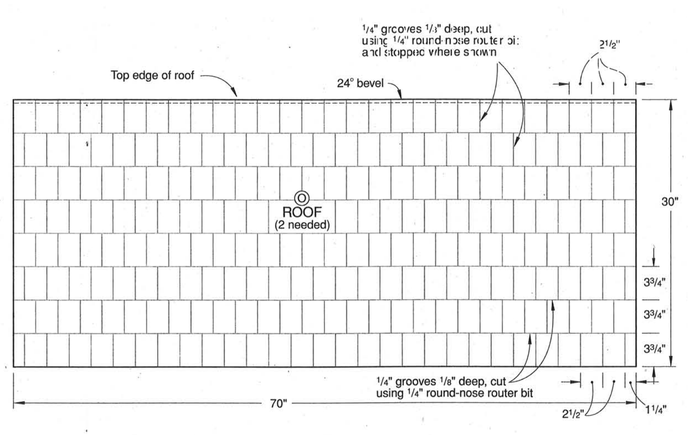


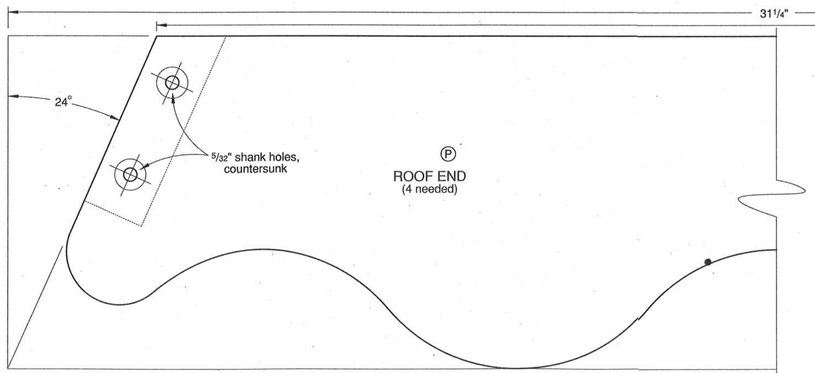


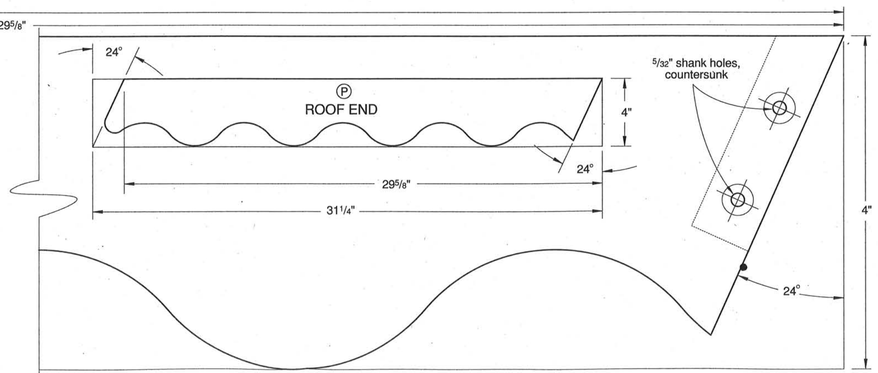












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WOOD® PATTERNS™
Full-sized for your woodworking convenience
APRIL 1996 ISSUE 87

Dear Reader: As a service to you, we've included full-sized patterns and parts views on this insert for irregular-shaped and intricate project parts. You can machine all other project parts using the Bill of Materials and the drawings accompanying the project you're building.

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- Wall shelf/mirror
- 3-way router jig
- Desk chime
- Kids' cottage
- Bronze beauties

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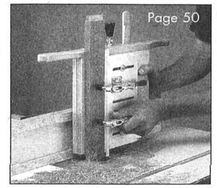
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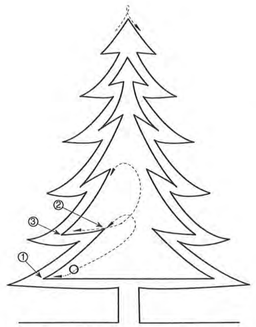
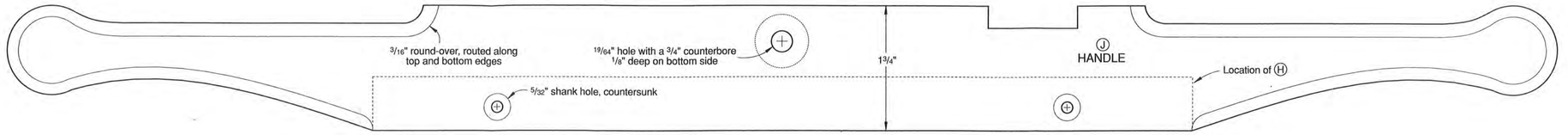
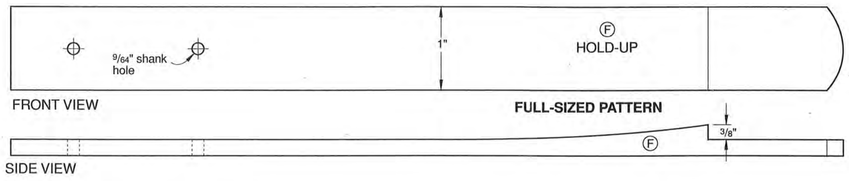


CUTTING SHARP TURNS


3/16" round-over, routed along top and bottom edges
19/64" hole with a 3/4" counterbore 1/8" deep on bottom side
1 3/4"
J HANDLE
Location of H
5/32" shank hole, countersunk

FULL-SIZED PATTERN



MULTI-JOINT ROUTER JIG
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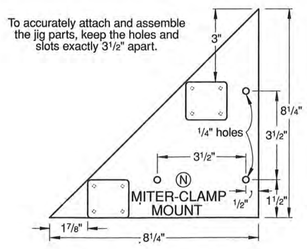
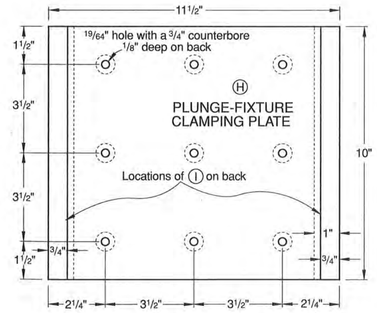
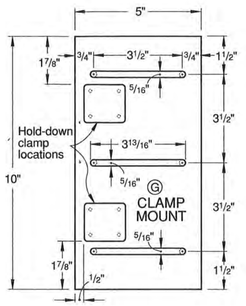
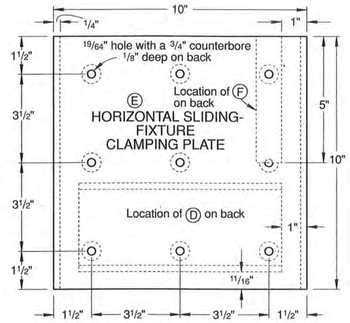
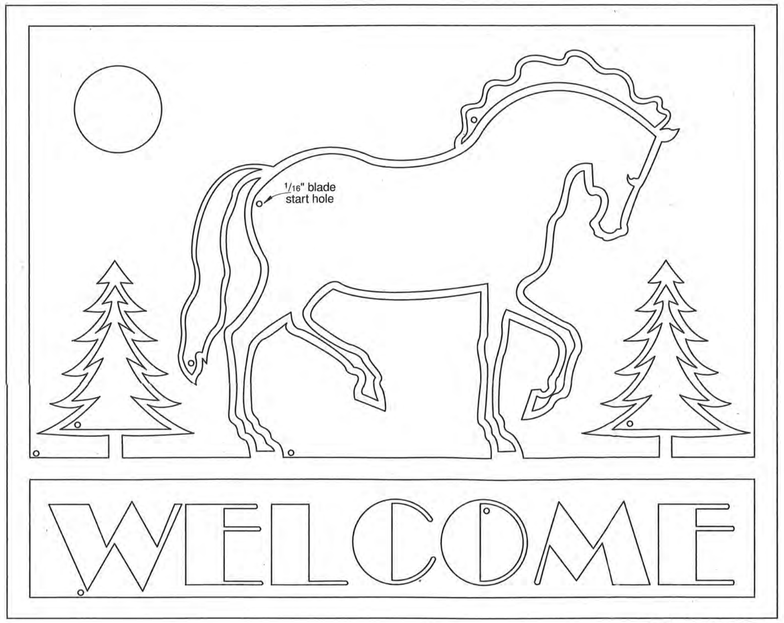
MULTI-JOINT JIG PARTS VIEW
(Not 100% in size)

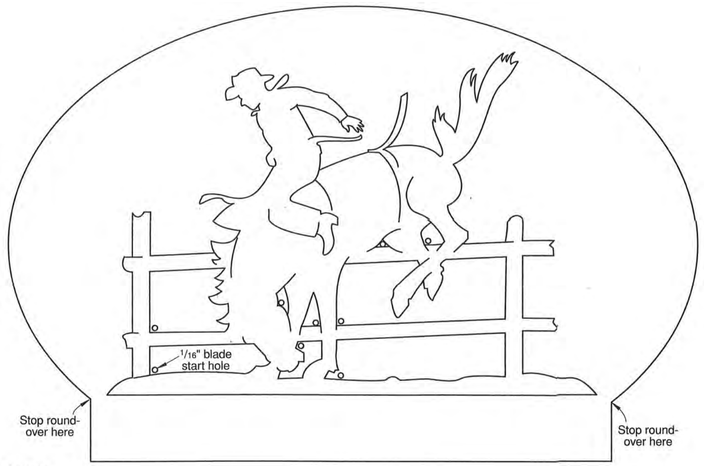


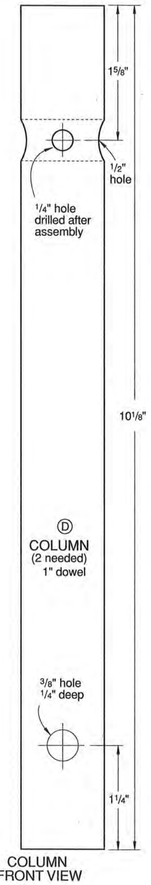
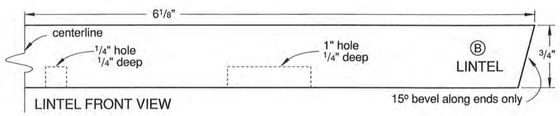
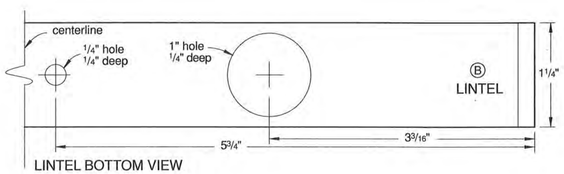
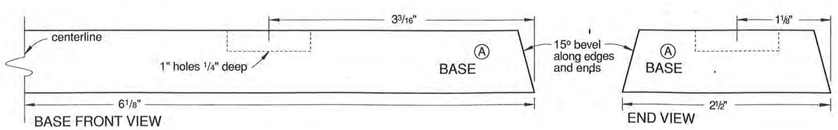
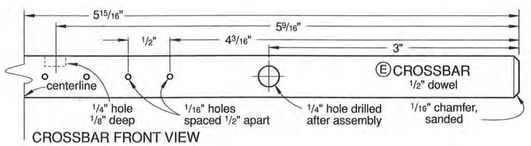
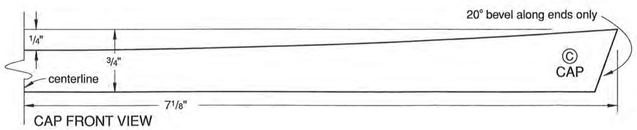
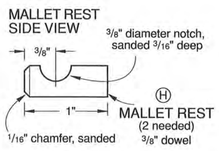
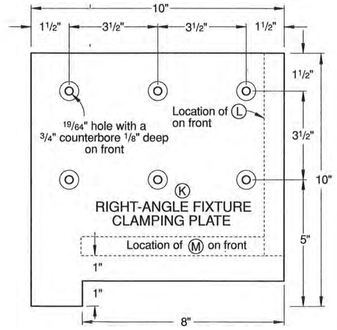
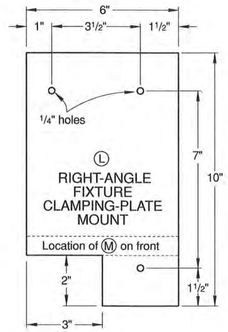












TWO BRONZED BEAUTIES
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FULL-SIZED PATTERNS